AUTOMOTIVE INDUSTRIES

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# Factory-Dealer Board Proposed

## Plan Up for Consideration at Dealer Code Authority Meeting July 23-25

by Don Blanchard
Editor, Automotive Industries

A proposal to create a three-man commission to handle factory-dealer relationship will probably be considered by the Code Authority of the Motor Vehicle Retail Trade when it meets in Washington July 23-25, according to J. Reed Lane, executive secretary. The commission would consist of one representative named by the dealers, one named by the factories and a neutral third party appointed by the President.

The proposal is the outcome of a movement among dealers, first reported in *Automotive Industries* of June 30, to obtain the cooperation of car makers in securing compliance with the new car price maintenance and used car allowance sections of the code. As reported last week, petitions are now being circulated in a number of states calling upon F. W. A. Vesper, chairman of the National Control Committee and president of the National Automobile Dealers Association, to obtain assurance of such cooperation. The commission is proposed as a means of making the desired cooperation effective in policing the code, the theory apparently being that it should be empowered to request, if not order, that a factory cancel a dealer when all other means of securing compliance had failed.

The possibilities of collective bargaining between dealers and factories on matters of mutual concern has been in the back of many dealers' minds for many years and there is little doubt that a certain amount of thinking along this line also is reflected in the present commission proposal. Recently the collective bargaining idea has been the subject of increasing discussion in the trade because, due to the code, the N.A.D.A. for the first time is truly representative of the dealer body since a large percentage of all car dealers now are members. There is some feeling that this organization strength should be used in dealing with the manufacturers on a collective basis.

The whole idea apparently is still in

(*Turn to page 66, please*)

### Deane Federal Housing Deputy Administrator

WASHINGTON—Albert L. Deane has been named a deputy administrator of the newly created Federal Housing Corporation. Mr. Deane is on leave of absence from his position as president of the General Motors Holdings Corp., and has been in the capital for about three months working on the administration's recovery program. He has long been an ardent student of broad social and economic problems, and it will be recalled that he presented his plan for stabilizing employment and purchasing power to the House Committee on Labor

### A.P.E.M. Supplement OK'd

WASHINGTON, July 19—NRA today approved the leaf spring product group supplement to the A.P.E.M. code.

### Frisco's Strike Halts Car Sales

SAN FRANCISCO — The general strike in effect here and in neighboring communities brought automobile sales to a virtual halt during the first three days of the week, nearly all dealers being closed during that period. Repair shops which have been unionized also were closed for the duration of the strike.

Although the executive committee of the Allied Automotive Industries of California issued a statement on Tuesday to the effect that the entire automotive industry here and in Oakland was closed down as a matter of policy until the present situation is clarified, this was denied by the Motor Car Dealers Association.

Automobile dealers in the area were urged to open salesrooms and parts departments on Thursday by the local administration of the dealers' code. Up to the time of the strike, June sales were 10 per cent ahead of May.

### Issuing Biennial Census Reports of Manufactures

WASHINGTON—The Census Bureau has started issuing individual industry reports on its 1933 biennial census of manufactures. The report on the automobile manufacturing industry is expected in August and that on motor vehicle body and parts manufacturing in September.

## Dealers' Association to Sponsor New York's 1935 Automobile Show

NEW YORK—The 1935 New York Automobile Show will be held Jan. 5-12, under the auspices of the Automobile Merchants Association of New York, Inc., according to an announcement made by Harry Bragg, general manager of the dealers' organization, following a meeting of the Board of Directors held July 18. The Board's decision to stage the show was unanimous.

At a later date a show committee will be appointed to handle the exhibition and after its organization further announcements of plans are anticipated. Although the decision will be up to the show committee, it is quite generally expected that the dealers will avail themselves of the N.A.C.C. show department headed by Alfred Reeves. The Chicago Show is still under negotiation.

# July Trend Parallels June Production and Deliveries

by Athel F. Denham
Detroit Editor, Automotive Industries

DETROIT—Mixed trends both in production and retail deliveries left the industry as a whole during the second week in July in about the same position it was at the same time in June. Reductions in manufacturing schedules on the part of several large producers were in good part offset by increases in the schedules of others. The general level, however, will be distinctly under June when the month is completed. Retail deliveries the second week of July obviously would be higher than during the holiday week, but in some cases manufacturers are actually reporting deliveries running ahead of the same week last month which was the peak month of the year.

At present, indications are that retail deliveries domestically should aggregate roughly 240,000 to 250,000 cars and trucks for the month of July with production in the neighborhood of 280,000 including Canada and export.

Stocks of some lines of cars indicate that a sharp curtailment in production in August or later in July would be called for if any considerable reduction in retail deliveries materializes during the next few weeks. Incidentally, although there are no official figures on dealer stocks of passenger cars in the United States, an authoritative source of May which was something over a 45 day supply in view of June sales. A place them at 367,000 units at the end year ago at the same time, it is estimated stocks amounted to 220,000 cars.

Chevrolet production for the first half of 1934 totaled 525,093 units, nearly 50 per cent over the first half of last year. June production was 98,147 units.

Increases over Pontiac's expected retail deliveries during June and first 10 days of July have resulted in an increase in Pontiac's production schedules for July and August by 5869 units, the total of three increases ordered in the last few weeks. June deliveries exceeded May by 1300 cars. Export shipments up to and including July show an increase of 31 per cent over first eight months of last year.

Dodge, DeSoto and Chrysler dealers delivered a total of 8862 cars week ending July 14, representing an increase over the same week in June of 33 per cent over same week of last year and a slight increase over the week ending July 7. Shipments for week ending July 14 totaled 7638.

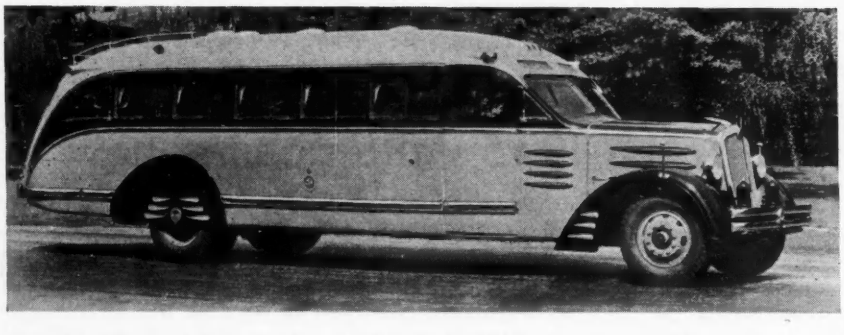
Dodge dealers for the week ending July 14 sold 2933 Dodge and 2859 Plymouth passenger cars and 888 commercial vehicles. Dodge car sales represent an increase of more than 500 over the previous week and about 400 over the peak week of June. Dodge car sales to date total 55,335, trucks 24,301.

DeSoto sales for the week ending July 14 showed an increase of 26 per cent over the previous holiday week. A total of 60,240 DeSoto and Plymouth cars were delivered at retail by DeSoto dealers during the first six months of this year.

Hupmobile reports orders on hand assures July shipments at least as good as June.

Factory shipments of the Hudson Motor Car Company for the six months ended June 30, aggregated 65,810 cars, including both Hudson and Terraplane shipments, Roy D. Chapin, president, announced today. This total represents an increase of 286.1 per cent, compared with shipments of 23,002 cars reported for the corresponding period in 1933.

Shipments for the first half of this year from the GM Canadian plant exceeded those of the first half of 1933 by 92.4 per cent, in fact shipments up to the close of last month for this year exceeded the total 1933 shipment by 7,714 units, an increase of approximately 30 per cent thus far.



Airstreamed Palace Hyway Coach for 29 passengers designed and built by the Bender Body Co. of Cleveland, O. Two spare wheels are enclosed in a compartment in the fishtail rear accessible through small doors

## Claim Discrimination In Auto-Lite Lay-Off

### Flare-Up Is Avoided When Kelly Explains Working of the Seniority Rule

TOLEDO—A flare-up in the labor dispute at the Electrical Auto-Lite plant here threatened this week when union officials claimed wholesale discriminations in the recall of workers following a two weeks' layoff of the plant.

Daniel H. Kelly, executive vice-president, declared there was some misunderstanding regarding the application of the seniority rule. He said the company would be happy to submit all disputed points to arbitration as provided in the contract with the employees. Under the contract those employed prior to February 23, date seniority from the actual date of employment and those hired after that date are equal in seniority ranking. In figuring the date of employment the company has selected the last date in case of many who have worked off and on for several years.

Union officials claim pickets, those against whom affidavits were filed and all those active in the strike, have been wiped off the payrolls of the plant.

## Mooney to Broadcast Foreign Trade Talk

NEW YORK — James D. Mooney, president of General Motors Export and president of the American Manufacturers Export Assn., will speak Monday, July 23, at 6.45 p. m. on "Our Stake in Foreign Trade." His talk will be broadcast over WEAF and will be carried by the NBC red network. Mr. Mooney will be introduced by Harry Tipper, executive vice-president of the association, who was formerly general sales manager of General Motors Export and previous to that connection, business manager of *Automotive Industries.*

# Reported That Johnson Would Have Eastman Administer Trucking Code

PHILADELPHIA — Under the heading "Will NRA Disown Trucking?" the current issue of *Commercial Car Journal* discusses a report that General Johnson is trying to shift administration of the trucking code and other transportation codes to the Federal Coordinator of Transportation, Joseph B. Eastman.

There is precedent for the contemplated shift. As early as last year Secretary of the Interior Ickes was given the job of smoothing the troubled waters of the oil industry, and the Agricultural Adjustment Administration was handed the job of harvesting the food industries code.

"These shifts were accomplished without much comment from the knockers," the article states. "There was no charge that the NRA was 'cracking up.' They were part of the program. And the program calls for further shifts. The outspoken, hard-hitting General Johnson has in mind turning over to other Federal agencies many of the codes for administration. But that doesn't necessarily mean that code regulation is on the way out. In many instances it clearly indicates a strengthening of code government."

The idea back of the proposed shift of the trucking code is that "transportation experts should administer transportation codes, and no one denies that Mr. Eastman is an expert in transportation, at least so far as railroads are concerned. The proposal is logical, viewed superficially."

The article continues with this analysis:

"It is safe to assume that transfer of the trucking code will not be made without the approval of Mr. Eastman himself. There are reports to the effect that already he has indicated his unwillingness to take over the job. If he were to accede he might compromise his position in respect to regulation of the trucking industry. He has recommended to Congress. . . . that common carrier and contract carrier interstate operations be placed under Federal regulation, and that the Interstate Commerce Commission was the only body qualified to regulate the trucking industry. That is the first stumbling block.

"The other is that the industry, having got a taste of self-regulation, would oppose strongly any attempt to force it under control of an agency so closely allied with railroad regulation. Of course, the Federal Coordinator's office and the I.C.C. are two separate agencies, yet they are dominated by the same principles and those principles are anathema to the vast majority of truck operators."

George A. Delaney

## Delaney Joins Pontiac As Electrical Engineer

PONTIAC — Appointment of George A. Delaney, known in automotive engineering circles, as electrical engineer for Pontiac Motor Co., has been announced by B. H. Anibal, vice-president in charge of engineering.

Mr. Delaney replaces Hermann Schwarze, whose sudden death broke up Pontiac's famous "Four Horsemen" team of engineers consisting of Anibal, Holden, Milner and Schwarze.

Mr. Delaney comes to the General Motors division after fourteen years of continuous service with the Graham-Paige Motors Corporation.

## *Ole Evinrude*

MILWAUKEE—Ole Evinrude, internationally known as the originator of the outboard engine for rowboats and other water craft, died of heart disease July 12. He was 57 years old. Born in Norway, Mr. Evinrude came to America with his parents in early youth, settling in Wisconsin. He became an expert machinist, spending his spare time experimenting in the internal combustion engine field.

In 1905 he organized the Motor Car Power Equipment Co. but shortly turned to water craft power and in 1908 formed the Evinrude Motor Co. to manufacture the Evinrude outboard engine. Mr. Evinrude sold the business in 1913, but in 1920 re-entered the industry by organizing the Elto Outboard Motor Co. In 1929 the Evinrude and Elto companies, with the Lockwood Motor Co., Jackson, Mich., were consolidated with plant and offices in the Elto plant in Milwaukee as the Outboard Motors Corp., with a capital stock of $4,000,000.

## Chrysler Engineers Elect Geo. B. Allen

DETROIT—At a recent meeting the following officers were elected for the Chrysler Engineers' Club: President, George B. Allen, chief engineer Dodge Brothers; vice-president, A. J. Sinclair, Research Dept.; secretary-treasurer, M. L. Carpentier, chassis design engineer; Irving L. Woolson, engineer, Plymouth plant, member at large.

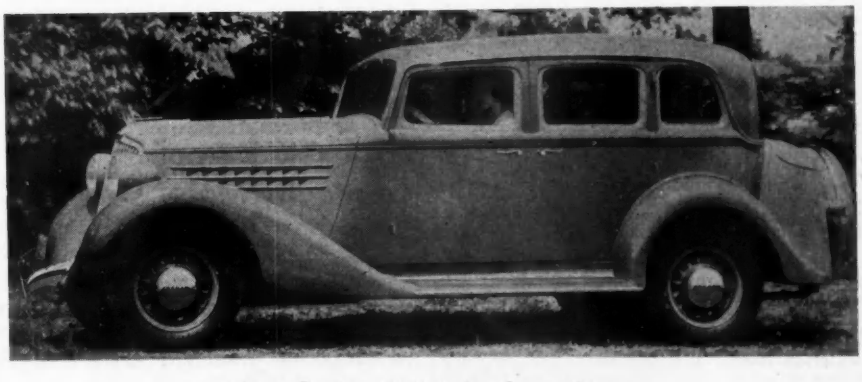
## Dodge Promotes Samson

DETROIT—D. A. Samson has been appointed assistant operation manager of all plants of Dodge Brothers Corp. He comes from the Dodge plant engineering division and has been with Dodge since 1915.

## City Machine & Tool Co. Alters Name to Cimatool

DAYTON—The City Machine & Tool Work of Dayton has reincorporated under the name "The Cimatool Co."

There has been no change in either company policy or executive personnel except for the addition of shop executives recognized as specialists in large body die practice.



**First Series 1935 Graham Sixes**

**New and improved streamline treatment marks the first series of 1935 Graham sixes just announced and placed on display at Graham distributors**

# More Steel Price Changes Foreseen

## Lower Prices on Black and Pickled Sheets Are Filed by Pittsburgh Mill

NEW YORK—Filing of a $1 per ton price reduction on common black sheets, 24 gage, by one of the Pittsburgh district rolling mills has strengthened the impression that the steel market's price structure may be further revised. The same producer filed another $1 per ton reduction in the price of hot-rolled pickled sheets, the new prices to become effective on Friday of this week. Other producers are expected to follow suit, and this change in prices may necessitate the revamping of the strip market's price structure.

The American Iron and Steel Institute's operating report for the current week indicates an increase from 27.5 per cent in the preceding week to 28.8 per cent, approximately one-half of what it was a month ago. Finishing mills, operating at a somewhat higher rate than primary producers, derive their principal nourishment from odds and ends business coming to them from automotive consumers.

General and steel market conditions being what they are, there is little incentive so far for buyers to anticipate their wants beyond actual requirements over the next few weeks. Reports that motor car manufacturers plan to maintain a relatively high rate of output in August form the basis for hopefulness on the part of the steel industry that the worst part of the recession following the heavy takings of steel in the second quarter has been left behind.

Signing of a wage pact by seven sheet mills with the Amalgamated Association was noteworthy chiefly because it denoted the complete parting of the ways between the country's third largest "independent" steel company and the union. This severance of relations follows after more than a score of years' bimonthly settlement of wage scales on the basis of prices obtained by employers for sheets during the preceding term.

**Aluminum**—Announcement of a change in the American representation of the leading Swiss aluminum producer carries with it the news that a member of a large banking house with Swiss connections has become identified with the American agency.

**Copper**—Much is being made of the disparity between the price at which American copper is available to European buyers and that which American consumers have to pay for "Blue Eagle" metal. Nevertheless, domestic stocks of refined metal are being whittled down, a reduction of 36,300 tons being noted in June. Resumption of mining on a quota basis by one of the Arizona producers, giving employment to between 250 and 300 men, is also noted. "Blue Eagle" copper continues to be held at 9 cents, delivered Connecticut, with the "outside" market at 8⅛ @ 8¼ cents.

C. E. Harwood
who has been appointed sales manager of the Automotive Equipment Division of the Russell Manufacturing Co.

## DeSoto Sets 32 A.A.A. Records on Muroc Lake

DETROIT — Stock Airflow DeSoto sedan and coupe models equipped with over-drive transmissions have broken 29 A.A.A. speed records in their class and three closed-car records, regardless of class, according to John J. Palmer, assistant to DeSoto's president. The record trials were made on a five-mile course on Muroc Dry Lake, Cal., under A.A.A. supervision.

The coupe established records of 86.06 miles per hour for the one kilometer; 86.29 for the one-mile; 85.05 for the five kilometers; 86.23 for the five miles and 85.98 for the 10 kilometers. The records were Class C division marks for closed cars of from 183 to 305 cubic inches displacement.

The sedan established all of its records on a 2,000-mile speed grind. The records included—80.88 miles per hour for 10 miles; 80.93 for 100 miles; 76.23 for 500 miles; 76.23 for 1000 miles; 74.74 for 2000 miles and 75.24 for 3000 kilometers. These records bettered previous class marks from 10 to 17 miles per hour.

In this 2000-mile run, the sedan attained a higher average for the 1000-miles, 2000-miles and 12 hours running time than any closed stock car ever made in an A.A.A. test. The three records were—76.23 miles per hour for 1000 miles; 74.74 for 2000 miles and 76.07 for 12 hours.

## NRA OK'S Applications To Modify Motor Codes

WASHINGTON — The National Recovery Administration has approved the application of the wholesale automobile trade and the motor vehicle retailing trade for modifications of their Codes to enable the respective Code Authorities to prepare budgets for the expense of administration of the Codes and a basis of contribution by members of the two groups to their budgets.

## Brewster Appointed to Service Show Committee

CLEVELAND—Clyde P. Brewster has been announced as a new member of the joint operating committee in charge of the Automotive Service Industries Show which will be held in Cleveland November 19 to 23.

Mr. Brewster is manager of the K-D Manufacturing Company, Lancaster, Pa., and is a representative of the Motor and Equipment Manufacturers Association, one of the three sponsoring organizations, the others being the National Standard Parts Association and the Motor and Equipment Wholesalers Association.

Mr. Brewster succeeds on the committee F. C. Bahr, formerly of Minneapolis, who was the committee's vice-chairman. Mr. Bahr recently resigned from Arrow Head Steel Products to become salesmanager of the Chrysler Motor Parts Co. The vice-chairmanship is now occupied by L. F. Hunderup of the Van Norman Machine Tool Company, Springfield, Mass.

## Waukesha Co. Celebrates Founding on Hoodoo Day

WAUKESHA—The traditional jinx of Friday the 13th held no terrors for the Waukesha Motor Co. when that organization celebrated 28 years of business activity with a stag party for its 750 workmen in the company's own park. Harry L. Horning, president of the company, personally directed the celebration, and in his invitation to the men pointed out that the Waukesha company and its employees continued to be busy and happy while all the world went through such upheavals as wars, strikes, famines and general economic unrest.

## duPont Buys Varnish Co. Founded by J. N. Willys

TOLEDO—The Mountain Varnish & Color Works, Inc., which has been in receivership since May 4 was sold Tuesday to E. I. duPont deNemours & Co. for $340,000 and the assumption of $544,294 in claims against the company. The sale has been confirmed by order of Judge Roy R. Stuart in Common Pleas Court.

The company was formed in 1919 by John N. Willys and headed by the late W. W. Mountain. It supplies paints to Willys-Overland Co. and other industrial customers. William I. Glidden has been receiver.

## Lon Smith Joins Hercules

CANTON—Lon R. Smith has become associated with the Hercules Motors Corp. For the past two years Mr. Smith has been connected with Cummins Engine Co.

# Wholesaling by Car and Parts Makers Subject to Customer Grouping Set by Jobber Code Authority

WASHINGTON—A classification of customers of automotive wholesalers into seven groups was made effective this week by the Code Authority of the Wholesale Automotive Trade. This classification is provided for in Article VII, Section C of the code which makes it unfair competition to sell any customer in a given classification at more favorable prices than is regularly given to that classification although sales may be made at less favorable prices.

Since the term "automotive wholesaler" is defined in the code to include all who perform a wholesale function, of the selling policies of manufacturers of vehicles and of parts and equipment who perform a wholesale service, are affected by the classification.

The classification has been submitted to NRA and since it has not been disapproved by that agency, the code authority is authorized to put it into force. Although the classification is effective immediately, it is subject to modification by NRA at any time and the Code Authority has made it clear that changes may be made to align the classification with a policy now being formulated by the Administration.

None of the classification definitions are to be construed as interfering or conflicting with any manufacturer, and/or his owned or controlled national sales company or companies, dealers or service station contracts and/or sales agreements, provided that such resale contract or agreement forms have had the approval of the Code Authority.

The seven classifications set up are:

A—Consumers—All owners of less than five motor vehicles, and insurance adjusters and agents when purchasing for adjusting a claim.

B—Retailers—Customers in the classification must have an established place of business. Includes storage garages, parking lots, maintenance garages, repairshops, tire and battery shops, paint and body shops, gas and oil stations, car washer and auto laundry, super service stations, used car dealers, and car dealers on non-franchise parts. The last group (car dealers) is not a mandatory classification and is provided primarily for car manufacturer members of the trade.

C—Retailers—Customers in this classification must have an established place of business—Retail automotive merchandise stores, chain gas and oil companies operating 10 to 49 (inclusive) stations, body builders, new car dealers and contract dealers. By "contract dealer" is meant any person regularly classified as a Class B retailer, when purchasing specific automotive merchandise on the basis of a contract with its manufacturer. A person becomes a contract dealer only on the specific merchandise overed by the contract.

D—Retailers—Car distributors, including factory branches, gas and oil companies operating 50 or more stations, chain retail automotive stores of three to 24 units, automotive machine shops reconditioning engines for retailers, car wreckers and used parts stores, and wagon peddlers.

E—Semi-Wholesalers—Persons selling both at wholesale and at retail with established place of business and assorted stock of automotive merchandise valued at not less than $2,500 at cost. At least 30 per cent of volume must be wholesale. Also included are major direct to consumer chain store operations of 25 or more units, and contract service stations.

X—Small Fleets of 5 to 49 vehicles used for business.

Y—Large Fleets—50 or more vehicles used for business.

Governmental agencies are to be classified as fleets according to the number of vehicles operated.

## Commercial Body Group's Code Gets Johnson's OK

WASHINGTON—The commercial vehicle body industry code of fair competition has been approved by General Johnson, and becomes effective July 30. Under the order of approval the code is not applicable to the repairing of commercial vehicle bodies by employees of owners of such vehicles.

## New GM Folder Depicts Each Individual Model

NEW YORK—General Motors Corp. this week sent to each of its 350,000 stockholders an illustrated pamphlet entitled "All in the Family." Each car in the GM line, including Chevrolet and GM Trucks, is illustrated with a human interest photograph and a series of side elevation views of individual models of each car and truck, together with prices and series designations.

## W-O Equipment Sale Nets $91,000 for Bond Trustee

NEW YORK—From the proceeds of the sale of surplus machinery, the National City Bank of New York, trustee for Willys-Overland sinking fund 6½ per cent bonds, which matured Sept. 1, 1933, has received $91,000 of the payment of $500,000 ordered last February by the U. S. District Court of Toledo. There are $2,000,000 face amount of the bonds outstanding.

## Ford Hits Knocking Competition in Ad

PHILADELPHIA—In an advertisement headed "There are some things we refuse to do to sell a car" which has appeared in a number of leading cities, Henry Ford takes a vigorous crack at knocking competition. It is understood that the advertisement was occasioned directly by the appearance of rather pointed and highly competitive copy, inserted by competing dealers in some localities.

The text of the Ford advertisement follows:

There are some things we refuse to do to sell a car. We like sales, but fair-dealing and the confidence of our customers are desirable too.

For one thing, we refuse to poison any one's mind against another make of car. We know what our car is and what it will do, and we are ready to tell you about that. But to imply defects in another car is not our business.

We have done our utmost to encourage intelligent buying of motor cars by showing purchasers how to protect their own interests. All that a good producer asks is a customer who knows quality when he sees it. An intelligent purchaser will speedily conclude that only a bad product requires bad sales methods.

We refuse to keep dinning in your ears that the Ford V-8 is the best, most economical, lowest priced car. That is claimed for several cars. Obviously it cannot be true of all. There comes a point where claims and adjectives and all advertising hysteria disappears in its own fog. Personally, I prefer facts.

We say the Ford V-8 is the best car we have ever made.

We say that our 8-cylinder car is as economical to operate as any lower number of cylinders.

We say that we have always been known as the makers of good cars and that the many good, well-balanced qualities of our present car place it at the head of our line to date.

Any one wishing to do business with us on these principles will find our word and the quality of our product to be A-1. What we say about economy, operation and durability will stand good anywhere.

## Six Months Statements

| Vehicle Companies | 1934 | 1933 |
|---|---|---|
| Auburn | —$1,645,666 | —$1,109,557 |
| Graham-Paige | + 20,005 | + 23,627 |
| Nash Motors | — 1,017,089 | — 279,605 |
| Total—3 companies | —$2,642,750 | —$1,365,535 |
| **Other Automotive Companies** | | |
| Mullins Mfg. Co. | + $149,307 | — $157,227 |
| Johns-Manville Corp. | + 173,855 | — 861,595 |
| Total—2 companies | + $323,162 | —$1,018,822 |

# Rear-Engined Auto-Union Car Features French Grand Prix Won by Alfa Romeo

by W. F. Bradley,
Paris Correspondent, Automotive Industries

PARIS (by Mail)—Averaging 85 m.p.h., Louis Chiron won the French Grand Prix, run July 2 on Montlhery track, at the wheel of a supercharged Alfa Romeo car. Achille Varzi came second and Guy Moll third, also on Alfa Romeo cars.

The feature of this race was the appearance, for the first time in twenty years, of German manufacturers' teams of racing cars. They were entered by Mercedes-Benz and by the Auto Union. Both makes represented very advanced design and in practice showed themselves faster than any of the French or Italian cars. In the race, however, they failed to stand the pace, all six dropping out with mechanical defects.

The Mercedes-Benz jobs have a straight-eight engine of about 185 cu. in. piston displacement, although the exact figure is kept secret. Cylinders are steel forgings with welded water jackets. Roller bearings are used for both crankshaft and connecting rods. The two overhead camshafts are driven from a train of gears at the rear. There is a vertical Roots-type blower driven from the front end of the crankshaft, with the carbureter mounted between blower and cylinders. The magneto is driven from the rear, and is on the driver's side of the dashboard. The transmission is combined with the rear axle. A feature of this racing car is the use of independent suspension for all four wheels. This is of the same type as used on the firm's stock cars, and is assured by means of horizontally placed coil springs. Streamlining has been very scientifically worked out, all of the axle and spring mechanism being enclosed. Hydraulic brakes are used. The weight of these cars is 1625 lb. without gas, oil, water or tires. The defects which developed in the race were a broken transmission, a defective carbureter control, and a fractured pipe on the hydraulic brake system.

Designed by Engineer Porsche, the Auto Union cars show a more advanced technique than the Mercedes. A sixteen cylinder V-type engine is used. The block is a single light alloy casting into which wet liners are inserted. Piston displacement is not known exactly, for the cylinder barrels can be changed, giving a considerable variation in the size of the engine. It is believed, however, that the size is between 245 and 320 cu. in. A light alloy detachable head is used. There is a separate exhaust camshaft for each line of cylinders, and a single camshaft for the intakes.

This engine is mounted in the rear of the chassis, behind the driver, and drives through a clutch and a five-speed transmission to the rear wheels. A vertical Roots-type blower is mounted at the rear of the engine, and draws mixture through a dual carbureter. A supply of air is assured through two scoops on the top of the tail.

In the front of the car there is a double radiator for both water and oil. The tubular frame members are made use of to convey the water from the radiator to the engine. The air passed through the radiator is discharged laterally, just ahead of the driver.

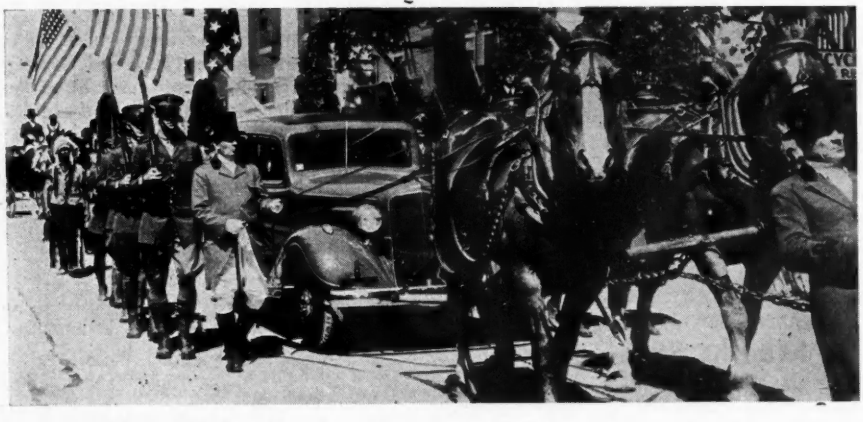
Independent springing is used all around, the Porsche torsion bar system being employed in front and a transverse spring with only three very thick leaves, at the rear. The reason for using laminated springs at the rear is that when the design was first laid out the torsion bar suspension had not yet been fully proved.

These cars proved remarkably steady both on the straightaway and on bends, being appreciably better in this respect than the Alfa Romeos, which are the most successful racing cars Europe has yet produced.

The winning Alfa Romeos, produced two years ago by Engineer Jano, are conventional compared with the German models. Their features are an all-aluminum straight-eight engines, with cylinders in two blocks of four bolted together, and having the timing gear in the centre. In order to get the driver low, the differential is in a casing just behind the four-speed transmission and drive is taken to the rear axle by two enclosed diagonal propeller shafts. The bevel gearing is thus close to the rear wheels. The weight of these cars has been brought down to 1609 lb. The maximum allowed under the present international racing rule is 1653 lb.

A maximum of 186 m.p.h. has been obtained by the Auto Union and the Mercedes cars. The Alfa Romeos, being less efficiently streamlined, have a slightly lower maximum.

## A Kingdom for a Horse!



Shades of Richard the Lion Hearted! Mackinac Island, last stronghold of the horse has given way to the motorized age. A Pontiac was permitted to come on the island, under horse power, as part of the celebration of the 300th anniversary of the arrival of John Nicolet, French explorer. Before the automobile was permitted to land all gasoline had to be removed from the tank

## Factory-Dealer Board Proposal

(*Continued from page* 61)

a rather nebulous state and the legal aspects of the proposal are still to be explored. Even if the factories were willing to go along with the plan, which is extremely doubtful, it is questionable that they could do so legally without running afoul of the anti-trust laws. Of course, under the Recovery Act, a way could possibly be found to remove this hazard. However, price fixing does not appear to be too popular with the administration at this time and the commission proposal is to a large extent a price maintenance plan. Consequently, that the administration would sanction the proposition is open to grave doubts.

Passing over these vital questions of factory and governmental attitudes, among the proposals which have been advanced in connection with the commission idea is that a code of fair practices be established and that a standard clause be inserted in all dealer contracts making violation of this code cause for cancellation. It has also been suggested that a clause be inserted in the contract patterned after the infringement provisions in some dealer contracts, which would require code violators to pay damages to the injured party.

In connection with the petitions whose distribution was announced last week, we are informed by W. D. Edenburn, manager of the Michigan dealer association, that the following states are busily engaged in campaigns for signatures: Delaware, Maryland, Ohio, District of Columbia, Minnesota, Pennsylvania, Indiana, New Jersey, West Virginia, up-state New York and Wisconsin.

# Auto Workers Group Asks Separate Parts Board; AFL Denounces Byrd

by Athel F. Denham
Detroit Editor, Automotive Industries

DETROIT—Possible labor troubles again came to the fore last week following the formation of the Automobile Workers' National Council. First objective of the Council apparently seems to be the parts and equipment plant rather than the automobile manufacturers. In this connection the council has already put itself on record demanding a separate labor relations board for the parts industry.

It is a well known fact now that the A. F. of L. is not pleased with the actions generally to date of the Automobile Labor Board in general. This board, headed by Dr. Wolman, has mandatory control over labor questions concerning automobile plants. It also has jurisdiction over questions dealing with parts plants as the result of an executive order some time ago, but only in case both sides agree to its jurisdiction.

In its complaint, the A. F. of L. claims that parts manufacturers are refusing to accept the board's jurisdiction and asks for a new board with mandatory control. At the present time there are several cases dealing with parts companies pending before Dr. Wolman's board and whether or not the A. F. of L. will refuse, in turn to let that Board deal with those questions is now also in doubt.

Doctor Wolman's board while having expressed its willingness to handle questions concerning parts companies of course has a rather crowded calendar, and necessary delays are normally to be expected. In the meantime, however, the reply from Washington the A. F. of L. request for a new board pointed out that only the President had authority to appoint such a board, and in the President's absence from the Capitol it is doubted that any action will be taken.

That this delay may be taken up as ammunition by agitators to start trouble in parts plants is quite possible. Highly desirable at present would seem to be indicated willingness on the part of parts manufacturers to have the Automobile Labor Board handle questions concerning them.

Of course another route to arbitration of labor disputes is available to both sides through the Detroit Regional Labor Board which has automatic jurisdiction over questions dealing with Section 7a of the National Industrial Recovery Act.

A second important development is that the A. F. of L. has finally come out in the open to demand the discharge of its own representative, Richard E. Byrd, from Dr. Wolman's board. *Automotive Industries* has on a number of occasions reported the Federation's dissatisfaction with Mr. Byrd's conciliatory attitude. The demand has come in the form of a communication from the new Council, not William A. Green, president of the A. F. of L.

**Richard E. Byrd**
**Labor's representative on the Automobile Labor Board, who has been attacked by the A.F. of L.**

Following are the telegrams between the Council and Lloyd Garrison on the subject of a separate labor board for the parts industry:

Mr. Lloyd Garrison, Chairman,
National Labor Relations Board,
Washington, D. C.

NATIONAL COUNCIL OF UNITED AUTOMOTIVE WORKERS IN SESSION AFFILIATED WITH THE AMERICAN FEDERATION OF LABOR AND REPRESENTING THE WORKERS IN ENTIRE AUTOMOBILE INDUSTRY URGENTLY REQUEST THAT YOUR HONORABLE BOARD IMMEDIATELY CREATE A BOARD HAVING JURISDICTION OVER ALL AUTOMOTIVE PARTS EQUIPMENT AND ACCESSORY DIVISIONS OF THE INDUSTRY EMBRACING THE SAME PRINCIPLE AS PRESENT AUTOMOBILE BOARD COMPOSED OF NEUTRAL CHAIRMAN REPRESENTATIVE OF LABOR AND REPRESENTATIVE OF MANAGEMENT STOP PRESENT AUTOMOBILE LABOR BOARD TOTALLY UNABLE TO FUNCTION IN ONE HALF OF AUTOMOBILE INDUSTRY BECAUSE PARTS MANUFACTURERS WILL NOT SUBMIT TO ITS JURISDICTION STOP MANY URGENT CASES OF DISCRIMINATION AND VIOLATIONS OF SECTION SEVEN A OF RECOVERY ACT WHICH CAN BE SETTLED ONLY BY ECONOMIC CONFLICT IF BOARD IS NOT CREATED

* * * * *

(Reply)
ONLY THE PRESIDENT CAN CREATE SUCH A BOARD AS YOU DESIRE STOP DETROIT REGIONAL BOARD AND OUR BOARD HAVE JURISDICTION OF SEVEN A VIOLATIONS STOP WILL BE GLAD TO DISCUSS SITUATION AT ANY TIME

Lloyd K. Garrison, Chairman,
National Labor Relations Board.

## Hupp Equips Cars With Sealed Cooling System

DETROIT—All cars turned out by the Hupp Motor Car Co. are now equipped with a sealed cooling system. The overflow pipe is closed and its action is controlled by a dual valve located in the filler cap. One of the two valves releases fluid or vapor to the overflow pipe when the pressure in the system exceeds 3½ lb. per sq. in., while the other prevents the pressure in the system from dropping too far below atmospheric.

By closing the cooling system, the boiling point of the cooling water is raised from 212 to 225 lb. per sq. in. The loss of water through boiling is thus reduced to a minimum. What is more important, the loss of alcohol from a non-freezing solution is greatly reduced.

Incidental advantages of the closed cooling system are claimed to be an increase in the efficiency of the engine, an increase in the capacity of hot-water heaters, relief from cooling troubles in high altitudes, and reduction in the tendency toward radiator clogging from incrustation.

## Mayberry Promoted

HAMILTON, ONT.—T. M. Mayberry has been appointed treasurer of Firestone Tire and Rubber Co. of Canada, Ltd. Mr. Mayberry, who is a Canadian, received his early business training with the Bank of Montreal. For the past six years he has been connected with the treasurer's office at the Akron offices of the Firestone company.

# Chrysler "Airtemp" Introduced in N. Y.

### Plan Mass Production of Air Conditioning Unit; Has Base Price of $175

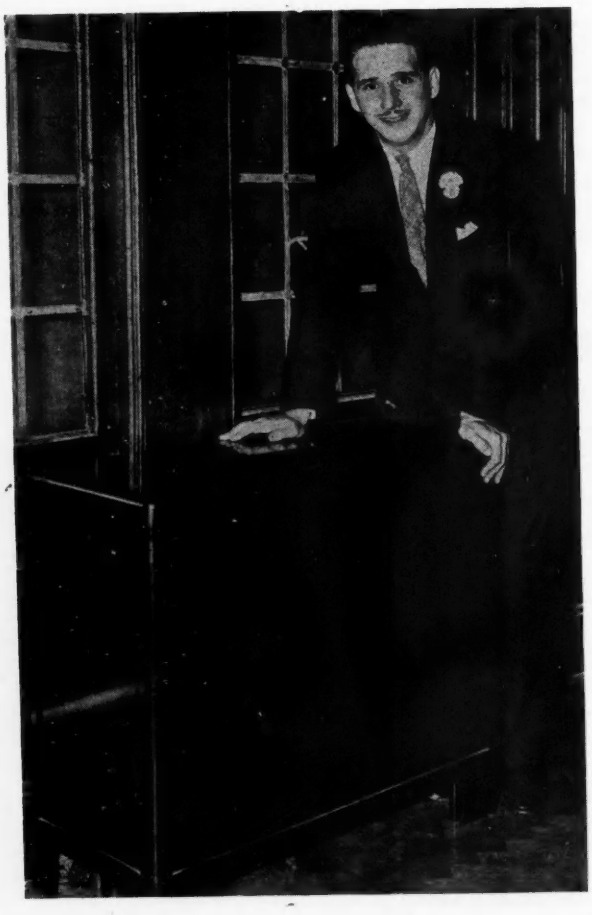
NEW YORK—Chrysler Motors entered the air conditioning field this week with a formal display of its new "Airtemp" conditioning units with a base price of $175. The exhibition was staged in the Chrysler Building here by the Temperature Corp. which has exclusive selling rights and which is headed by Walter P. Chrysler, Jr. The new corporation aims "to develop, on a mass production basis, a low-price market for air conditioning equipment which will enable persons of modest means to equip their homes and offices, apartments, stores and shops, with the new units at a much lower cost than has been heretofore possible."

The new units were developed in the Chrysler research laboratories (under the direction of Carl Breer, it is understood) and are being manufactured in Detroit. The selling program of the Temperature Corp. will be patterned along automobile lines, providing for merchandising through distributors and dealers.

The equipment may be used for cooling in summer, and for heating and humidifying in winter. Where the temperature of the regular water supply does not exceed 65 deg. F., no compressor is required for cooling. When the water supply does not meet this requirement or when it is desirable to use mechanical refrigeration, either of two methods may be employed. One uses the refrigerant to chill the water circulating through the cooling coils of the conditioning unit while the other circulates the refrigerant gas by direct expansion. For installations employing mechanical refrigeration, a full line of condensing units up to 15 tons capacity is available.

The conditioning unit itself is about the size of an ordinary heating radiator, the exact dimensions of the cabinet being 36¼ x 31 x 15 in. The cooling equipment consists of blowers driven from opposite ends of a ⅛ hp. motor which circulate air through a water spray and thence over the coil through which the coolant passes. This coil is made of finned aluminum tubing. When water at 50 deg. F. is circulated through the coil at the rate of 30 lb. per min. with an air velocity of 600 cu. ft. per min. and air temperature of 80 deg. with 50 per cent relative humidity, the cooling capacity of the unit is said to be 200 b.t.u. per min. In winter, of course, either hot water or steam is circulated through coil instead of the coolant.

The base price of $175 covers a unit of this character using the regular water supply as a coolant. On the basis of New York City water costs and climatic conditions, it is estimated that the annual water expense of the unit would not exceed $7.



**Walter P. Chrysler, Jr., shown with one of the new "Airtemp" conditioning units. Mr. Chrysler heads the Temperature Corp. which has exclusive sales rights on the equipment**

# Wholesalers Seek Price Differential

### Briefs Filed Requesting Classification Compared With All Retail Groups

DETROIT—Briefs have been presented to NRA at recent public hearings in Washington by the wholesale division of N.S.P.A. requesting that wholesaler classification be accorded a price differential as compared to any and all retail classification, according to a bulletin issued by H. N. Nigg, secretary of the N.S.P.A. division concerned.

Briefs covering this point were submitted at the recent hearings on the following A.P.E.M. supplement: Piston Ring Product Group; Automotive Electrical, Lighting and Reflecting Devices Product Group; Automotive Gasket Manufacturing Product Group; Replacement Automotive Water Pump and Parts Product Group; Replacement Piston and Pin Manufacturing Product Group; Replacement Valve and Valve Parts Manufacturers Product Group; Piston Ring Product Group; Spark Plug Product Group.

The statement of principle contained in the brief for the Valve and Valve Parts Code is somewhat typical of all of the briefs, and is as follows:

"The Wholesaler Division of this Association stands for the principle that the function performed by wholesalers is essential to the efficient and expedient distribution of the products of this Product Group; that a price differential should be accorded wholesalers as compared to any and all retail classifications; that automotive wholesalers must compete directly with the wholesale outlets of car manufacturers, and therefore that sales to car manufacturers by members of this Product Group should not be exempt from the Trade Practice Rules and other provisions contained in this Supplemental Code; and that certain other limitations provided in this code, which tend to unduly restrict the free flow of merchandise, should be amended or deleted."

# Half of Plymouth Frame Business to Smith Corp.

MILWAUKEE—A. O. Smith Corp., Milwaukee, has received one-half of the Plymouth frame business for next year from the Chrysler Corp., Detroit, it is announced. The order will call for around 200,000 units, it is understood. For some time the Smith Corp. built a large part of the Chrysler frame requirements, but during the past year the entire supply has been derived from a large frame maker with plants in Detroit and Ohio.

**Smiths Sell and Buy 1,000,000th Pontiac**

John Smith (and Mrs. John Smith) purchased the 1 millionth Pontiac. The Smiths bought their car from a dealer named Smith and they live in Ashuelot, New Hampshire. "Buyer" Smith and "Dealer" Smith are left and right respectively

## C. F. R. Test Under Way at Uniontown

### Committee Seeks to Tie Up Laboratory and Road Knock Ratings of Fuels

UNIONTOWN, PA.—A second series of tests under the direction of the Cooperative Fuel Research Steering Committee are being held on the famous Uniontown Hill near here. The purpose of the test is to determine the degree of correlation between laboratory knock ratings of representative fuels by the "Tentative Method of Test for Knock Characteristics of Motor Fuels" (ASTM Designation: D357-33T) and ratings of the same fuels in current models of cars; and to help throw light on the specific reasons for the variations in ratings of sensitive fuels obtained on different cars.

Four foreign representatives are participating in the tests: R. Stansfield, Anglo-Persian Oil Co., and C. H. Sprake, Anglo-American Oil Co., both representing the Institution of Petroleum Technologists of England; Claude Bonnier, Chef du Service des Essais, delegate of the French National Office of Liquid Combustibles; and L. Helliwell of Imperial Oil Refineries of Canada. The United States is represented by eighteen organizations, including the Bureau of Standards and Yale University.

C. B. Veal, S.A.E. Research Manager and Secretary of the C.F.R. Committee, is in charge of records and in general is serving in the same capacity as in the first series of road tests run here in 1932.

## Hudson and Plymouth Pictures Have Premiere

DETROIT—Two premieres were given during the past week at the studio of Wilding Picture Productions, Inc., of sound pictures for the automobile industry. The pictures are "Four of a Kind" and "Timed to a Second" and were respectively for the Plymouth Motor Corporation and Hudson Motor Car Company.

"Four of a Kind" is a safety picture with the majority of the important scenes laid at the Indianapolis speedway, during the practice periods just previous to the last Indianapolis race.

"Timed to a second," the Hudson and Terraplane picture, features Lowell Thomas, well-known radio commentator and globe trotter. Mr. Thomas is shown visiting the Hudson plant where he is taken through many of the manufacturing operations.

## ATA Plans to Hold First Annual Meeting in Sept.

WASHINGTON — Representatives of every division of the trucking industry, coming from every state in the union are expected to attend the first annual meeting of the A.T.A. The convention is to be held during September, and while the meeting place has not yet been designated it will in all probability be one of the larger mid-western cities.

The tentative plans call for a three or four-day conference at which there will be group meetings segregated as to types of operation. Meetings for secretaries of code authorities and secretaries of trucking associations also will be held. Nationally known speakers are expected to appear on the program.

According to latest reports from the A.T.A. 185,477 vehicles have been registered from all states and the District of Columbia up to and including July 13, in accordance with the provisions of the trucking code.

## APEM Holds NRA Rule Affects Mimeographs

DETROIT—Under an NRA ruling any company operating a "printing plant" which is not an integral of the product turned out by the member of an industry operating such a plant must operate that plant in conformity with the labor provisions (wages and hours) of the Graphic Arts Code, according to an announcement of the Code Authority Committee of A.P.E.M.

A.P.E.M. construes this ruling to cover all such departments of a business organization as the mimeographing machines, etc., and urges all A.P.E.M. members write General Johnson, protesting the ruling in an effort to have it rescinded or more definitely clarified.

## New Zealand Announces Revised Tariff Rates

WASHINGTON—A revision in New Zealand's tariff rates has been reported to the Department of Commerce by Vice Consul Walter W. Hoffman, stationed at Wellington. The revised rates, effective July 11, increase the margins of British preference.

The following changes are of particular interest to American automotive manufacturers:

Automobiles, trucks, buses, and similar motor vehicles completely knocked down, 52½ per cent, 7½ per cent (formerly the duty under the general tariff was 40 per cent ad valorem and in cases where such motor vehicles were imported having bodies suited or designed for carrying passengers, an additional duty known as "body duty" of 16¼ per cent, based on the value of the vehicle including the body, was assessed provided that where the value for duty of the vehicle including the body exceeded £200, body duty of 16¼ per cent was levied on the first £200 and body duty of 8¾ per cent on the remainder; the duty under the preferential tariff formerly was 10 per cent ad valorem, with corresponding body duties of 11¼ per cent and 6¼ per cent respectively); other automobiles, trucks, buses, and similar motor vehicles, 60 per cent, 15 per cent (same as above); tires exceeding 1¾ in. in diameter: (a) pneumatic 8d. (40 per cent), 2½d. (10 per cent); (b) solid 4d. (40 per cent), 1d. (10 per cent); traction engines, 20 per cent (40 per cent), free (10 per cent).

# Business in Brief

### Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

With the more favorable weather last week, general business resumed its upward course. There was an improvement in both wholesale and retail trade. Industrial operations increased; steel operations were higher, but bituminous coal production showed a decrease as compared with that last year. The cotton market became more active on the Government's report that cotton plantings are about a million acres smaller than had been generally expected.

#### Car Loadings Drop

Railway freight loadings during the week ended July 7 totaled 519,807 cars, which marks a decline of 124,765 cars below those during the preceding week, a decrease of 23,703 cars below those a year ago, but an increase of 103,879 cars above those two years ago.

#### Department Store Sales Hit

Department store sales during June declined more than the usual seasonal amount. The Federal Reserve Board's preliminary adjusted index stood at 73, as against 77 for each of the three months preceding.

#### Current Consumption Up

Production of electricity by the electric light and power industry in the United States during the week ended July 7 was 1.1 per cent above that a year ago. The total was the smallest reported since December, 1933.

#### Factory Employment Off

New York State factory employment during the month ended June 15 declined 1.2 per cent, while total payrolls dropped 1.8 per cent. As compared with the figures for a year ago, employment showed a gain of 19.7 per cent and payrolls an increase of 26.6 per cent.

#### Lumber Production Falls

Production of lumber during the four weeks ended June 30 was 18 per cent below that in the corresponding period last year. Shipments and orders received were 42 and 51 per cent lower, respectively.

#### Oil Output Gains

Average daily crude oil production for the week ended July 7 amounted to 2,564,300 barrels, as against 2,529,200 barrels for the preceding week and 2,596,250 barrels for the corresponding period last year.

#### Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended July 14 was 77.9, as against 77.8 the week before and 78.0 two weeks before.

#### Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended July 11 showed a decrease of $7,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and government securities remained unchanged.

## New Series of Tubular Trailer Axles Announced

DETROIT — Timken-Detroit Axle Company has announced a new series of tubular trailer axles. Several improvements have been made in the design. The axle is now an all-steel integral unit, with tubular beams of tempered steel. The spindles, which are made of alloy steel, are now larger and are said to bear the correct proportion to the tubular beam. Another important change is in the wheel assembly, where New-Series Timken taper roller bearings are fitted and are more widely spaced for increased wheel stability. The brake drums are heavier than in the earlier design.

## *Edward H. Belden*

DETROIT — Edward H. Belden, 64 years old, died June 11, in Harper Hospital. He was at one time an engineer for Packard Motor Car Co., and later became vice-president in charge of engineering for Willys-Overland Co., Toledo. Prior to his association with Packard, Mr. Belden organized the Belden Engineering Company which specialized in automobile designing. Early in his career he was connected with McCormick Harvester and later Westinghouse Electrical and Manufacturing Co. at East Pittsburgh, Pa.

## Seek to Solve Truck Insurance Problems

### Dr. J. C. Nelson to Make Study of Increased Costs

WASHINGTON—Under the direction of Dr. J. C. Nelson, formerly associated with the Brookings Institute, Washington, D. C., the national code authority for the trucking industry, has begun a series of studies seeking a solution of the insurance problems confronting truck operators.

Commenting upon the industry's present insurance problems, Dr. Nelson said insurance costs are steadily mounting, one estimate places costs at from $125 per year for a half-ton truck up to $1,200 per year for the largest vehicles. Dr. Nelson said two causes were believed responsible for this condition, one is the constantly increasing restrictive state regulatory measures and the other is that insurance companies consider truck operators bad risks. Because of the latter, Dr. Nelson pointed out that manual rates have been increased 25 per cent for local work and as much as 75 per cent for over-the-road operations in many instances by the National Bureau of Casualty and Surety Underwriters.

Ted V. Rodgers, chairman of the national code authority, has appointed the following committee to work with Dr. Nelson: R. W. Barnwell, North Carolina; Maurice Tucker, Indiana; H. D. Berkowitz, Pennsylvania; Robert A. Anderson, Missouri, and Robert Stockton, Illinois.

## Portuguese Import Duties on Cars Increased 20%

WASHINGTON—The Portuguese government has increased import duties on automobiles in all categories approximately one-fifth over old rates, according to an announcement received at the Department of Commerce. Weight classifications remain unchanged, says the announcement, but the new rates are effective immediately and will be levied upon automobiles now in shipment or in custom houses.

American manufacturers will be affected more than others because of the popularity and demand for American-made cars in Portugal.

# Michigan Dealers Get Authority to Require Restitution from State Compliance Director

DETROIT — The right of the State Advisory Committee to adjust complaints and to require dealers who sell a car in violation of the fair trade section of the motor vehicle retail code to make restitution to the dealer or dealers deprived of the sale by unfair methods, has been recognized by Abner Larned, Michigan State NRA Compliance Director, according to a bulletin issued by the Michigan Code Administration Bureau.

"In the case of willful and continued violation," the bulletin states, "not only will restitution be required, but the State Compliance Director will secure, through the Federal District Attorney, an injunction from the Federal Court restraining the violator from further violation of the Code."

Where restitution cannot be made, it is stated that Mr. Larned agreed immediately to present such violations to the U. S. District Attorney for court action either by injunction or for violation of the Recovery Act.

The Code Bureau served notice that the case of anyone heretofore proved guilty of code violation who commits another violation, will be referred immediately to the federal district attorney through the NRA Compliance Director.

In the matter of requiring restitution, the bulletin appears to be in sharp conflict with a statement made recently by NRA Deputy Administrator Ammerman in charge of automotive codes in a letter to the Maryland State Advisory Committee. "We do not under-emphasize the importance of self-government by industry," Mr. Ammerman said, "but it is beyond the power of the Administration to confer upon committees composed of industry members authority to determine violations and collect assessments levied against alleged violators. No such authority can be legally vested elsewhere than in the courts." This statement, incidentally, is paraphrased in an article in the July 10 issue of the N.A.D.A bulletin.

All automobile violations, the bulletin says, have been held to be interstate in character by NRA and this ruling has been upheld in some federal courts. The point is of particular importance in Michigan because so large a proportion of the cars sold in that state do not cross a state line in delivery from factory to dealer. The NRA ruling, of course, is subject to further court test and the principle probably will have to be determined finally by the Supreme Court.

The power to require "restitution" in proven cases of code violation is one that dealer code authorities have contended for since the beginning. At one time it was understood that this power could be exercised by putting the restitution in the form of a "voluntary contribution." Subsequently it was held that this practice was not permissible. The Michigan bulletin would indicate that the NRA Compliance Director had sanctioned it for that state although, of course, if the accused dealer refuses to make restitution, the only recourse is to the courts. Furthermore it remains to be seen whether federal district attorneys will take as active an interest in the prosecution of trade practice complaints referred to them by NRA compliance directors as this bulletin seems to anticipate.

## An "Automotive Rarity"

One of the few "sunshine" tops ever built in this country. Buick recently turned out this job for a customer in Pasadena, Calif. The top is made of pyralin

## Chevrolet New Car Buyers Purchase 35,000 Radios

DETROIT — Chevrolet dealers have sold 35,000 automobile radios to purchasers of new cars in the last ninety days, M. D. Douglas, parts and service manager of the Chevrolet Motor Company, reports. The total does not include the additional thousands sold to owners of earlier Chevrolets or of other makes.

## "Annie Oakleys" Taboo Under Air Code Terms

NEW YORK—Free trips on air lines are practically abolished by an amendment to the fair practice clause in the air transport code of fair competition, the Code Authority for that industry has announced.

In the future the issuance of a pass on any air line operating scheduled services must fall within a definite category prescribed in the code amendment, and penalties are provided for violations of this restriction.

O. Max Gardner, of Washington, D. C., former Governor of North Carolina, has been appointed general counsel to the Code Authority.

## Dealer Over-Crowding Unsound, Says Klinger

### Pontiac Head Criticizes Practice at Maryland Association Convention

OCEAN CITY, MD.—The policy of over-crowding dealers in a territory was criticized as "unsound, unfair and short-sighted" by H. J. Klinger, Pontiac president, in an address delivered at the recent annual convention of the Automobile Trade Association of Maryland. Mr. Klinger pointed out that considerable cost is incurred in changing dealers, and to pack them in means an increase in turn-over.

"It is axiomatic that you can't sell goods without outlets," Mr. Klinger said. "I do not believe any manufacturer can operate over the long pull unless he recognizes the fundamental principle that he can be successful only in proportion to the success of his dealers. Because I feel that way, I care more about sound planning for next year, and the year after that, than I do for next month's sales. By the same reasoning, I have been opposed to over-crowding dealers in a territory. . . . I would far rather have one healthy dealer than two sick ones struggling for their business lives. The healthy one will be with me over a longer period of years. There can be no question that the dealer and manufacturer share a common aim in this industry, and that the success of one is directly dependent upon the success of the other."

## June Crude Rubber Consumption Drops

NEW YORK—Consumption of crude rubber by manufacturers in the United States for the month of June amounted to 40,242 long tons, which compares with 43,012 long tons for May. June consumption shows a decrease of 6.4 per cent under May and 20.7 per cent below June a year ago, according to the Rubber Manufacturers Association. Consumption for June, 1933, was reported to be 50,743 (revised) long tons.

Imports of crude rubber for June are reported to be 49,683 long tons, an increase of 3.6 per cent over May and 118.6 per cent above June, 1933.

June reclaimed rubber consumption is estimated to be 9,459 long tons, production 10,820 long tons, stocks on hand June 30, 23,664 long tons.

# New Industrial Appeals Board Created To Advise Johnson on Code Complaints

WASHINGTON—To perform in somewhat the same fashion as did the abolished National Compliance Board, the new NRA three-man Industrial Appeals Board will be organized about Aug. 1. The new board's duties will be purely of an advisory nature. In the language of the Johnson order creating it, the board will "advise and make recommendations to the Administrator with respect to effect of code provisions on small enterprises." In other words whatever action is taken by NRA as a result of the Compliance Board's findings will be at the discretion of General Johnson.

The board to a large degree at least also replaces the recently abolished Darrow Recovery Review Board, stormy petrel whose career was marked by head-on collisions with NRA. The Darrow Board's obsession was that codes have been used to oppress small enterprises and to create monopolies. It is interesting therefore that NRA's announcement of the new board, to be headed by Amos J. Peaslee, New York, says it will be "a forum for a hearing of all sorts of complaints against the operations of codes but particularly those of small businesses that codes oppress or discriminate against them or favor monopolies." Distorted as were pictures of codes as drawn by the Darrow Board, it concentrtaed on the very tasks that the new board is to take up. John S. Clement president of the Sandura Co. of Philadelphia, and Mgr. John A. Ryan member of the faculty of the Catholic University are the other board members.

Obviously the new board, made up of high-grade men, will function in a more judicial way than did the Darrow Board and results from it will be quite different from that of the Darrow Board. Yet the new board, although called an "Appeals" Board can only make recommendations. NRA, however, expressed the belief by being charged with responsibility of hearing certain types of non-compliance cases, it will greatly stimulate code compliance. In cases of complaints by small business it may recommend the granting of relief by exemptions, exceptions, or modifications and according to NRA, it will be adequately equipped to insure prompt disposition of the complaints referred to it.

The new board is expected to be organized early in August. It will occupy quarters in the Department of Commerce Building formerly used by the old National Labor Board. NRA also has its headquarters in the Department of Commerce Building.

## Vermont Denied Code Exemption

WASHINGTON — The National Recovery Administration has denied the application of the Vermont State Advisory Committee for an exemption from the hours of labor provisions of the code of fair competition for the Motor Vehicle Retailing Trade.

The application sought an exemption which would allow mechanics to be employed to work not more than 44 hours, averaged over a period of six months; and not more than 54 hours in any one week during such period. In denying the application the Administration took the ground that if this exemption were to be granted similar exemption would have to be granted to the same trade in other states for like reasons which would in effect constitute an amendment to the code.

## "Ride Demonstrator" Developed By Plymouth

DETROIT — Plymouth has developed the "Ride Demonstrator" for use by salesmen when demonstrating Plymouth's knee action to prospects. The equipment consists of the front spring assembly painted white, a special solid hood panel with the legend "Take a Ride, Watch the Plymouth Knees Work" painted on it and special lamp brace. The necessary work is done at the factory at a net cost of $7.50.

The fender, which is removed, the replacing hood panel with louvres, fender bracket and all necessary parts and fittings for installation are shipped with each ride demonstrator at no additional cost.

## Shipments of Pneumatic Casings Gained in May

NEW YORK—Shipments of pneumatic casings for the month of May amounted to 5,331,699 casings, an increase of 20.1 per cent over April and 2.9 per cent above May, 1933, according to the Rubber Manufacturers Association.

Production of pneumatic casings for May is reported to be 4,456,223 casings, a decrease of 6.6 per cent under April and 14.1 per cent below May, 1933.

Pneumatic casings in the hands of manufacturers May 31, amounted to 11,126,567 units, a decrease of 7.1 per cent below April 30, 1934, but were 64.6 per cent above stocks May 31, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

| | Shipments | Production | Inventory |
|---|---|---|---|
| May, 1934... | 5,331,699 | 4,456,223 | 11,126,567 |
| April, 1934 .. | 4,438,378 | 4,769,980 | 11,980,731 |
| May, 1933... | 5,180,173 | 5,189,291 | 6,760,165 |

## Tire and Battery Trade's $274,500 Budget OK Asked

WASHINGTON—The code authority for the Retail Rubber Tire and Battery Trade has asked NRA approval of its budget of $274,500 for the fiscal year beginning May 1, 1934. The basis of contribution is a graduated scale of assessment based upon gross consumer sales of products and the number of outlets in each sales bracket. The total assessment will be approximately $298,000 if 100 per cent is collected. This is approximately $23,500 more than the budget calls for.

## CALENDAR OF COMING EVENTS

### SHOWS

American Transit Assoc., Cleveland, Ohio ..... Sept. 22-27
Cleveland (Automotive Service Industries) ..... Nov. 19-23

### MEETINGS

American Chemical Society, Cleveland, Ohio ..... Sept. 10-14
American Welding Society, New York City ..... Oct. 1-5

### ANNUAL MEETINGS

Natl. Assoc. of Motor Bus Operators, Cleveland ..... Sept. 21-22
Natl. Safety Council, Cleveland, O., Oct. 1-5
Institute of Traffic Engineers, Cleveland ..... Oct. 2-3

### CONVENTIONS

American Society for Metals, New York City ..... Oct. 1-5
American Transit Assoc., Cleveland Sept. 24-27
International Foundry Congress, Philadelphia ..... Oct. 22-26
American Foundrymen's Assoc., Philadelphia ..... Oct. 22-26
National Foreign Trade Council, New York ..... Oct. 31-Nov. 2

### EXPOSITION

Natl. Exposition of Power & Mechanical Engineering (Biennial) New York, N. Y. ..... Dec. 3-8

# JUST AMONG OURSELVES

## Employment Per Car Manufactured

THE number of men employed per car manufactured in our automobile plants has increased materially since the beginning of NRA. Indexes derived from Federal Reserve Board data, for instance, show employment per car stood at 116 in May, 1934, as against 86 for May, 1933, 1923-1925 average being the base.

About the same time this figure was published, we ran across an item in the British *Economist* showing that at the Austin Motor Co., Ltd., of England, the number of men per car manufactured in 1922 was 55; in 1927, was 11; and in 1934 was 8. The actual number of men at work, however, increased materially from 3197 in 1922 to 11,465 in 1927 and to 16,000 in 1934.

The United States is so far in the lead as the dominant automobile producing country of the world, of course, that it is inconceivable that its premiership in world markets ever should be seriously threatened, regardless of increased costs and decreased efficiencies brought about by government interference in operations.

Survey of world automotive news, though, does bring many minor items indicating increased automotive activity in many places. The intense efforts of the Japanese were described recently in *Automotive Industries;* the reduction in horsepower tax in Great Britain is a first small move toward making British manufacturers more potent in world markets; Soviet plants—with 44,762 cars and 34,211 trucks—have exceeded production quotas for the first six months of this year; in Germany a $250 car is projected which would carry a 1500-cc. engine, carry four people and have a load capacity of 1000 lb.; a motor car factory now is under construction in Turkey; and reports are circulating that Turkey will undertake to supply Persia with certain machinery, including motor car parts for assembly.

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## Tough Going for High-Priced Cars

THE plight of the makers of high-priced cars under maximum used car allowance code provisions gets no better as the year wears on. Despite strenuous sales efforts all along the line, the public still refuses to accept the fact that a Ford traded on a Cadillac is worth the same as a Ford traded on a Chevrolet. While car sales as a whole were increasing about 58 per cent in four months of 1934 as compared to four months of 1933, the high-priced group was recording a 25 per cent decline.

Code requirements about used car allowances can't be blamed for all of this decline, but unquestionably they have vastly accelerated a trend already started by improved characteristics of low-priced models and relative depletion of consumer bankrolls. Even in the panic months of January to April of 1933, the high-priced group accounted for about 1.8 per cent of total car sales, while this year its proportion fell to about .9 per cent.

It begins to look as though the "$2,000-and-up" market of the future finally is going to resemble the "$4,000-and-up" market of the past.

There has been profit in the "$4,000-and-up" market and there will be profit in the "$2,000-and-up" market—but probably not for companies concentrating exclusively on that field.

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## U.S.S.R. Organizing a "Noble" Class

THE old order changeth . . . but the new one often seems to have its springs in the same wells of human aspiration and desire. Officially called "The Noble People of Our Country," a communist aristocracy is reported to be growing up in the U.S.S.R. Membership goes to those who have done well their task, though it be lowly and of arduous character.

Members of the order, it is reported, have the privilege of buying much-desired goods or services which are denied to others even though they might be able to pay for them. One of the plums accruing to members of the order is the chance of being given preference in the waiting list for automobiles, for which the factories are said to have orders for months ahead.

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## Production Forecast Still Looks Good

IF motor vehicles production averages 163,000 for the last six months of this year, the 1934 total will exceed 2,775,000; if it averages 200,000, the year's record will approximate 3,000,000.

There is every evidence, in other words, as we pass the halfway mark that the final production figures for 1934 will come within the 2,500,000 to 3,000,000 range predicted at the beginning of the year.—N. G. S.

# Do Streamlined Car

AT a recent joint meeting of the French Society of Automobile Engineers (S.I.A.) and the Society for Aerial Navigation (S.N.Ae.), M. Andreau, director of aerodynamic research of the Chausson Works, presented a paper on "Air Resistance and the Automobile," in which he discussed the effects of air currents on road vehicles from every angle.

A complete aerodynamic investigation of a new model of the Delage Company (Model D8-18) had been made in the wind tunnel of the Chausson Works, together with tests on scale models of other cars, and the paper was based mainly on these tests and the results thereof. All tests in the research work done for the Delage company were made on scale models, which represented different body types with various combinations of fenders, headlamps, etc., the object being to find the form having the least air resistance. The investigation was divided into three parts, as follows:

1. Determination of the coefficient of air resistance.
2. Study of the pressure distribution over the outside of the vehicle (aerodynamic phantom).
3. Determination of the metacentric curves (effects of side winds on operating characteristics and the stability of the car).

Following is an adaptation (not a direct translation) of Part I of the paper. The other parts will follow in later issues.

The formula for air resistance is

$$R = k A V^2$$

where $R$ is the air resistance in lb.

$k$, the air resistance coefficient;

$A$, the frontal projected area in sq. ft.

$V$, the speed of the car in m.p.h.

The results are corrected for deviations from the standard atmosphere (60 deg. Fahr., 29.92 in. of mercury column barometric pressure, and 0.0767 lb. per cu. ft. of air).

Air-resistance determinations were made by two methods: (1) on a single scale model surrounded by the air stream, and (2) on two identical scale models fastened together, wheel to wheel, so as to reproduce the road-surface effect as defined by the theory of images in aerodynamics. All models were made to a scale of 1 in 10. By far the best results were obtained with the last-mentioned of the two methods, and this, therefore, was standardized. It was found that with the models used the mean velocity in the plane of symmetry is very close to the air velocity at a distance, and this explains the very good check of the results. One advantage inherent in the use of two symmetrical models is that the length of the lever arm of the aerodynamic balance is accurately defined by the plane of symmetry.

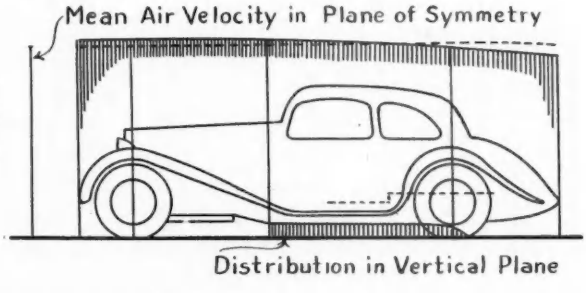



Fig. 1 — Variation of air speed in the plane of symmetry of the vehicle

Curves were drawn showing the dependence of the air resistance on the Reynolds number. When this relation is plotted on logarithmic paper it gives a straight line, and such lines naturally can be drawn with a high degree of accuracy (Fig. 1). The Reynolds number is the product of a characteristic dimension of the object or model and the velocity of the air stream at a distance from the object, divided by the kinematic viscosity of the air. The latter is the quotient obtained by dividing the coefficient of viscosity of the air by the density of same. This number therefore is a product of velocity and length, which defines the similitude ratio. The air resistance $R$ varies as $N^n$, where $N$ is the Reynolds number and $n$ an exponent which is generally negative.

Corrections were made to take account of the relative magnitude of the assembly of model and arm, the correction factors used being the conventional ones for free-arm tests.

In addition, a study was made of the mode of flow of the air around the body by means of a smoke generator, and also by means of light vanes (spinning wheels), which latter assume the direction of the air currents where these are steady, and are set into more or less energetic rotation in regions where there is turbulence.

Tests were made on the following models:

Profile $A$, that of the stock model car (Fig. 2).

Profile $B$ that of a new body model of the sports type, with windshield at

## M. Andreau's Conclusions on Streamlining

**The profiles of present-day so-called streamlined bodies do not reduce the air resistance materially. Development work on the fenders, running boards, and headlamps seems much more promising.**

**It is even questionable whether the changes which are now being made in the forms of bodies properly come under the heading of streamlining, and whether their motivation is not largely commercial. In the latter case, M. Andreau suggests, such names as Hurricane, Blizzard, Typhoon, Sirocco, etc., body would be more appropriate than streamlined body.**

**The wide gap between the results actually obtained and those hoped for shows that the problem is a very complicated one. In order to effect any worth-while improvement it will be necessary to make systematic laboratory investigations similar to those by which the elements of airplanes were developed.**

# Bodies Cut Air Resistance?

## Not much, says French engineer who concludes from tests that development work on fenders, running boards and headlamps offers greater promise of progress

## Part I

22 deg. 30 min., rear end semi-streamlined, spare tire enclosed (Fig. 3).

Profile *C*, that of a body of the Maybach type, with windshield at 45 deg., rear end sloping continuously, spare tire enclosed (Fig. 4).

To these bodies were added either stock fenders or fenders of the enveloping (skirted) type.

The scale models were built with great precision, the under side being sculptured to close dimensions; they were, moreover, divided into several sections which were demountable and adjustable, so that numerous combinations of front and rear ends could be made up, all comprising the same basic elements.

In the following table the results of air-resistance tests are given for the three types of bodies fitted with skirted or enveloping fenders and with elongated head lamps, all things except the body profiles being the same:

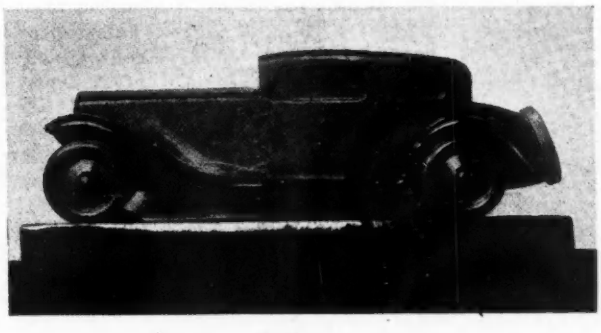


Fig. 2—Scale model of car with stock body

### Test Results

| Body type | k | Reduction of $k$ | Speed variation |
|---|---|---|---|
| Stock | 0.00213 | | |
| New Model | 0.00213 | | |
| Maybach | 0.00202 | 5 per ct. | 1.6 per ct. |

From these figures it will be seen that the profile of the body proper plays only a small part, so far as air resistance is concerned.

The results of the wind tunnel tests on the new-model body with skirted fenders may be checked, moreover, with those of tests of the actual car on Monthlery track. The data of this track test were as follows:

Weight of car, 3550 lb.
Forwardly projected area, 21.5 sq. ft.
Engine horsepower, 102.
Speed on level course, 87 m.p.h.

By assuming the efficiency of transmission to be 95 per cent and remembering that the French or metric horsepower is equal to 32,500 ft-lb. per min., we find that the propelling force is 410 lb. The average coefficient of rolling resistance on Monthlery track is 16 lb. per 1000, which gives a total rolling resistance of 57 lb., leaving 353 lb. for overcoming air resistance. By calculating $k$ from the equation

$$k = \frac{R}{A\,V^2}$$

we find that it is equal to 0.00215.

Now, the results of the wind-tunnel tests, which covered the Reynolds number range defined by $VD = 1$ and $VD = 4$, when plotted on section paper give a curve which passes through the value $k = 0.00215$, thus corresponding exactly to the results of the Speedway test. This confirmation of the wind-tunnel tests is considered of the greatest importance, as it indicates that the air flow over the body in the wind tunnel is identical with that on the road.

It is thus seen that a simple change in body outline, within the limits applying in this case, reduces the air resistance only 5 per cent and increases the speed only 1.6 per cent—figures which the author considers absolutely negligible.

The following table shows the effect of changes in fender form on the air resistance. The difference in the form of the stock fenders and that of the enveloping fenders is made clear by a comparison of Figs. 2 and 3.

### Effect of Fenders

| Stock-Body Headlamps Elongated | $k$ | Reduction of $k$ | Gain in Speed |
|---|---|---|---|
| Stock fenders | 0.00213 | 7.8per ct. | |
| Enveloping fenders | 0.00213 | 7.8 per ct. | |
| Without fenders | 0.00146 | 36.6 per ct. | 14 per ct. |

Fig 3—Scale model of semi-streamlined body

Enveloping fenders resulted in a reduction in air resistance with all of the different body models, as compared with the stock fenders. By removing the fenders entirely—which did not result in any material decrease of the forwardly projected area—the coefficient of air resistance was decreased by 36.6 per cent.

The reduction in air resistance resulting from the removal of the fenders thus was seven times as great as that due to improvement of the body profile, and M. Andreau remarks that a thorough study of the sheet-metal parts of cars of current model—the fenders and running boards—promises considerable success, particularly since investigation of the mode of air flow around the body gives results which help to explain the unfavorable effects of these parts.

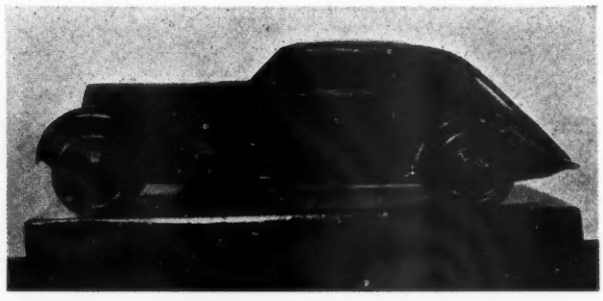


Fig. 4—Scale model of streamlined body

Assume a vehicle which with full passenger load weighs 3080 lb., with a fuel mileage of 19.6 per U. S. gallon at a speed of 43.5 m.p.h. This is a common figure for a popular make of French car. At this speed the air resistance absorbs two-thirds of the power and therefore is responsible for two-thirds of the fuel consumption.

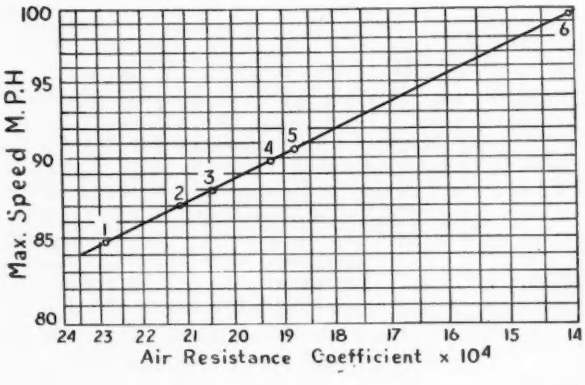



**Fig. 5—Variation of maximum car speed with air-resistance coefficient**

New Style Body. 1—Stock fenders, elongated lamps. 2—Enveloping fenders, elongated lamps. 3 — Enveloping fenders, stock lamps. 4—Enveloping fenders without lamps. 5—Enveloping fenders, without lamps, under side enclosed. 6—Without fenders, without lamps, under side enclosed.

It has been shown that by eliminating the headlamps from the outside of the car, the air resistance can be reduced 11 per cent, and since the air resistance is responsible for two-thirds of the power consumption, this would result in a saving in power and fuel consumption of 7.35 per cent. If the car were driven 10,000 miles per year and the fuel cost were 17 cents per gallon (average American conditions) elimination of the headlamps from the outside of the car would result in an annual saving of $6.40. If the change were made on 20,000,000 vehicles the annual saving would amount to $128,000,000.

By making changes in both the lamps and the fenders as described, the value of $k$ is reduced from 0.00228 to 0.00141. This represents a reduction of 38 per cent, which would result in a reduction of 25.2 per cent in the fuel consumption, so that under the conditions stated in the preceding paragraph the annual saving on a single vehicle would be $21.80 and the saving on 20,000,000 vehicles, $436,000,000. At a time when taxes are going up all around, these figures are not to be sneezed at.

Those who originated the elongated form of headlamp—also known as the streamlined lamp—were of the opinion, no doubt, that it would reduce the air resistance, but the tests show that the shorter lamp actually has the least resistance. But whether the lamp is long or short, its air resistance is greater than that of a flat disk of equal diameter. A gain of 11 per cent is possible by the elimination of headlamps in their present form—that is, twice as much as the gain possible by improvement in body profile.

Tests on the Speedway with elongated headlamps and without headlamps respectively resulted in a gain in speed of 3 m.p.h., or about 3.5 per cent, and this agrees well with the result of the wind-tunnel tests.

Fig. 5 shows the relation between car speed and the coefficient of air resistance as determined in these tests. By the improvements enumerated the coefficient was reduced from 0.00228 to 0.00141, which represents a gain of 38 per cent. By using the Maybach type of body, removing running boards, fenders and headlamps, and streamlining the under side of the car, the speed was increased from 85 to 100 m.p.h.

M. Andreau worked out two examples to show the importance of the air resistance as a factor influencing the propelling power required and the fuel consumption:

## Effect of Headlamps

| Body | $k$ | Change in $k$ | Change in speed |
|---|---|---|---|
| New Model, stock headlamps | 0.00205 | | |
| Skirted fenders, lamps elongated | 0.00213 | +3.8per cent | −1.3 per cent |
| Maybach body, lamps elongated* | 0.00220 | | |
| Stock fenders, without headlamps | 0.00197 | − 11 per cent | +3.5 per cent |

## Effect of Mudpan*

| New Body Model | $k$ | Change in $k$ | Change in speed |
|---|---|---|---|
| Enveloping Fenders | | | |
| Without mudpan | 0.00213 | | |
| With mudpan | 0.00202 | −4.8 per cent | +1.7 per cent |

* Smooth enclosure of under side, to prevent disturbance of air as much as possible.

## Effect of Proximity of Road Surface

| Body | $k$ without road action | $k$ with road action | Effect of road interaction |
|---|---|---|---|
| Maybach, enveloping fenders, elongated lamps | 0.00179 | 0.00202 | 0.00023 |
| New model " " " " | 0.00179 | 0.00212 | 0.00033 |
| Stock car, stock fenders and lamps | 0.00192 | 0.00218 | 0.00026 |

A determination of the value of $k$ was made for the vehicle represented by Fig. 6. The form is that of a Joukowski wing of aspect ratio 1/4. It is provided with an N.A.C.A. cowl in front for an air-cooled radial engine. Both front and rear fenders are crowned and separate from the streamline body. It comprises a theoretically correct section. This vehicle complete has an air-resistance coefficient of 0.00136. Therefore, the figures cited in the foregoing are not unattainable. Nevertheless, the coefficient of air resistance for this car is far above that of the pure streamline body from which it is derived.

Which proves that we are far from understanding the subject.

It will be seen that the interaction with the road surface increases the air-resistance coefficient by from 12 to 18 per cent, even for relatively high values of $k$, approximately 0.0018.

The reaction between the paired scale models was also measured. With scale models of the new body there was a vertical repulsive force of 77 lb. at 87 m.p.h. To eliminate this repulsive force and thus obtain a minimum value of $k$, the models must be given a negative inclination.

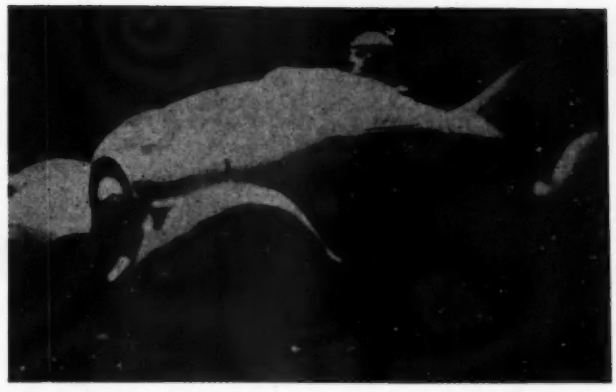


Fig. 6 — Streamlined body resembling a Joukowski wing section, based on the correct theoretical form

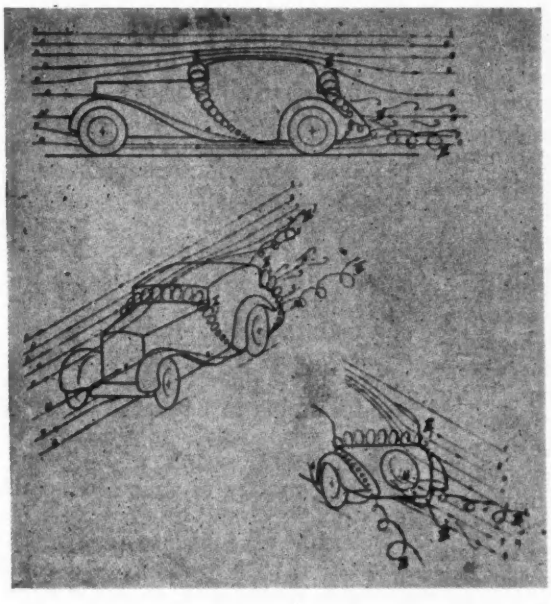


Fig. 7 — This sketch shows clearly the two stationary swirls in front of the windshield and above the rear trunk, as well as the two attached swirls behind the rear wheels

M. Andreau here gave an entomological analogy of the problem confronting the car designer. He said that in the moorlands he had observed a carnivorous insect which chases its prey by running after it, and is capable of extraordinary speed. It is about 2 in. long, from ¼ to 5/16 in. wide, has no wings, is streamlined, and relatively flat. When it runs it raises itself on its legs, which are quite long, curves its body to form an arc that is concave toward the top, with the head lower than the abdomen—a veritable airplane-wing section reversed. It has to run fast to get its food. Another type of insect, the gilded "carabe," also a great runner, runs the same way as the "staphylin" referred to in the foregoing, with its head lower than its abdomen.

The author expressed the opinion that these insects undoubtedly knew the secret of motion with least air resistance, and that we would do well to study them, even though their style of locomotion differed from ours.

Other tests, particularly on assemblies of streamline tubes, have shown the enormous influence of interactions, especially when the air-resistance coefficient is low. It was found, for instance, that for coefficients $k$ varying in the ratio of 1 to 7, the interactions varied as 7 to 1, that is, in the same proportion but in the opposite sense, so that the total resistance of an assembly is not materially changed and is practically independent of the profile. In the case cited there are numerous interactions; these are less for a vehicle traveling over the road, which gives a basis for the hope that in this case it will be possible to reduce $k$ materially.

## Flow of Air Around a Vehicle

Observed air movements are shown diagrammatically in Fig. 7. They comprise several elements, as follows:

1. Smooth flow lines numbered consecutively from 1 to 8.
2. Two stationary swirls I and II.
3. Two attached swirls III and III′.
4. An alternating (reciprocating) flow IV at the rear between the two attached swirls.

The neutral line $N$ is at substantially the same level at front and rear, at about one-third the height of the radiator.

Stream 6 swerves laterally and downwardly and joins the stationary swirl I where that originates, in front of the windshield. The lower ends of this swirl pass underneath the running boards, between the rear wheels, and reunite underneath the body at the lower end of the attached swirl II in back of the body, above the trunk.

Swirl II at its lower ends joins the two attached swirls III and III′, which constitute a sort of eddying wake continuing far to the rear of the car and being comparable to the attached swirls at the ends of airplane wings. Between these attached swirls there is an alternating flow which is analogous to the air movements that may be observed behind spheres and prisms for certain values of the Reynolds number.

It is quite understandable that if the running boards were removed and the lower side portions of the body panels provided with an outlet, swirl I would join swirl II with less restraint, and the air resistance would be reduced.

A study was made also of the air flow around vehicle $C$ with 45-deg. windshield and continuously sloping rear end. Swirls I and II were still present. They became exceedingly flat and their intensities increased. The attached swirls were much more powerful than in the case of the stock car.

Results so far obtained are not sufficient to enable one to say offhand what form to give to the car body, but they may form the subject of speculation which comparative tests may permit to interpret correctly, and to make use of.

# Budgeted Replacement Fund Buying Program on a "Pay-As

by Joseph Geschelin
Engineering Editor, Automotive Industries

WHEN equipment for normal improvement of production facilities is needed, where is the money coming from?

This question is not intended as a brain twister. It results directly from a persistent management problem. The fact of the matter is that factory executives find it difficult to get appropriations for much-needed production equipment. They can prove the need for certain machines or tools; they can show the anticipated savings. Usually that's as far as they get—because the management can't spare the money out of the general cash fund.

Of course there is always the "Reserve for Depreciation" to fall back on, but unfortunately it's a peculiar balance sheet item (as explained later) and does not represent cash.

Financial executives may deny most emphatically that reasonable improvements are hamstrung for lack of funds. We believe this can be explained by making a distinction between a new building program (which goes through) and normal replacements (which usually lag). A new building program occasioned by an increase in sales or the introduction of a new model or unit is one thing; it is well understood and the appropriation is voted by the board as a part of the projected sales and manufacturing program.

But the day-in-day-out program of improvement entailing periodic renewal of production equipment is not so dramatic—not so well understood—and not so readily explained to financial executives. It's a horse of a different color. Yet it is no less a vital part of the enterprise, holding as it does the key to the company's ability to keep abreast of its progressive competitors.

Obviously, what is needed is the establishment of a fiscal policy designed to finance the regular replacement of equipment, in conjunction with a permanent program of improving the production facilities. Whatever constructive work is done in this direction must come from the financial end of the business.

Wherever production costs are known accurately, the product is presumed to carry its portion of the charge for depreciation plus a conservative estimate of obsolescence. Under this set-up, the sales dollar, as collected, brings in its share toward the replacement account. Many ways are open to free some of this income for the use of the factory—each organization must choose its own solution.

Before going much further let us dispel the illusion concerning the balance sheet method of providing funds for equipment replacement. To this end we quote from an authority on technical accounting. Prof. W. F. Fiske of M.I.T.*

## Prof. Fiske Dispels An Illusion

"The nature of the Reserve for Depreciation is understood by relatively few persons outside those who have had accounting training. Two important reasons largely explain this misunderstanding. The first is an unfortunate terminology which uses the word 'Reserve' to cover several fundamentally distinct concepts, and the second is a tendency to confuse the two aspects of the depreciation transaction with the normal financial effect of including depreciation as an expense item. If the origin of the Reserve for Depreciation is kept in mind its nature will be clear. The Reserve is merely a segregation of a portion of the decreases in Plant; it represents plant which has been consumed in operations, as opposed to plant which has been sold, scrapped or otherwise disposed of. The Reserve for Depreciation is, then, a negative asset, or, better, a deduction from an asset. It has been most aptly likened by one author to the 'hole in a doughnut.' The area of a cross-section of a doughnut is the total area inside the outer circumference less the area of the hole; the net value of plant is likewise the original cost less the accumulated hole in the asset, the Reserve for Depreciation. Such a hole in an asset cannot possibly be an asset itself, contrary to the more or less popular misconception of the Reserve for Depreciation as cash.

"When shown that the 'Reserve for Depreciation' cannot be cash, but is rather a deduction from an asset, people are apt to conclude that in such case depreciation is only a bookkeeping manipulation and can be of no interest to any persons other than accountants. This is not true. It is the 'Depreciation Expense' which provides for replacement, not the Reserve for Depreciation.

"Expenses are the values given up in carrying on operations; unless assets acquired through sales at least equal expenses, the enterprise has not maintained its capital, and, as it is commonly expressed, has lost money. Whether the proprietor segregates funds to be used for replacing the goods sold, for replacing the cash spent for wages, and so on, or not, is a matter of financial administration."

Scientific accountants are frank to admit that with a cost system which properly includes a charge for depreciation, the company's income automatically becomes the source of funds for the replacement of depleted equipment. The only joker is their statement that the segregation of funds is a "matter of financial administration." The gap between the financial administration and the factory must be bridged in the interest of the company's welfare.

Theoretically, one solution lies in the establishment of a "Cash Replacement Fund" earmarked for the purchase of new equipment such as we suggested in our paper read before the I.A.E. Congress of the S.A.E. last August. On general prac-

*"Amortization, Depreciation, Obsolescence and Replacement," by Wyman F. Fiske, paper read before the American Institute of Chemical Engineers, Roanoke, Va., December 12-14, 1933.

# Puts Equipment You-Go" Basis

tical grounds the idea has been opposed for the following reasons:

1. Because it would tie up some of the company's funds and make them unavailable for general purposes.
2. Because of low interest rates on investments.
3. Because of difficulty of making safe liquid investments.

In making the first point, one of our critics admitted that while some form of "earmarked fund" would be of great help to the factory, the special privilege was hardly worth the unusual effort. The question is—is it a special favor to an individual, or is the proposition a matter of good business so far as the company is concerned?

Despite these objections many well-informed people believe that some modification of the "earmarked fund" principle is needed to assure a fiscal policy recognizing the fundamental requirements, that (a) the product must carry its portion of the charge for depreciation and obsolescence, and (b) that part of the sales dollar belongs to the replacement account.

Several methods of approach have been suggested. For example, Professor Fiske believes that, "The object sought for a replacement fund can usually be equally well obtained through *financial budgeting* without tying up funds in low-earning assets. The assets retained through depreciation charges in the early years of business operations provide a satisfactory source of funds for expansion, since, as has already been pointed out, such funds will never be required for replacement. It is probably safe to consider most of the funds retained through depreciation charges as available for any corporate purpose; the problem is to find the most desirable and profitable use for these and all other funds under the control of the business regardless of their source."

Another specific recommendation has been made by Professor Raymond*, who said in part:

"The important fact remains that funds have been recovered from revenue during the life of equipment which represents the original investment in that equipment. Regardless of the use made of such funds when received, it must be recognized that if the equipment is to be replaced, equivalent funds must be made available to the operating executive when the need arises. The manner of securing such funds is of course optional with the financial executive. Since the latter are generally opposed to setting up special funds in cash or securities, the operating executive must place before his financial colleagues a schedule of replacements and cash requirements sufficiently far in advance of his needs so that the actual funds will be available at the time of purchase. The financial executive must then cooperate with the plant officials and support their requests.

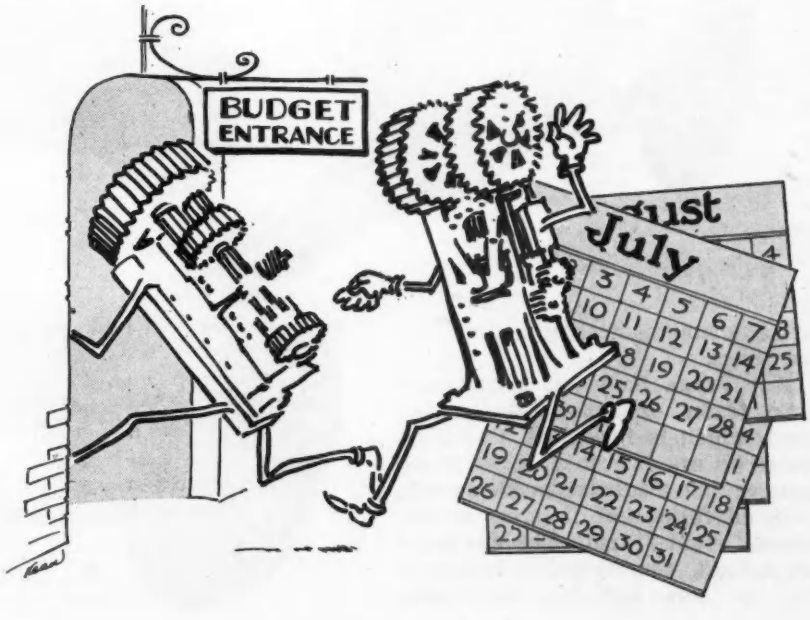
"The greatest trouble comes in times of business uncertainty when cash is not easily obtainable. The opportunity still exists for someone to demonstrate beyond any doubt that in the long run it is economical to maintain a fund for replacement.

"In any event, the conclusion is inescapable that there is another obligation which management must recognize if the total capital resources are to remain unimpaired: To insure the perpetuation of the enterprise through the provision of funds for replacement."

The consensus seems to favor an equipment policy consisting of a program of continuous replacement, paid for out of currently accumulated funds which would be made available through the medium of a financial budget. This would assure the availability of funds as and when needed without tying up the company's cash reserves.

If the funds provided for replacement in the financial budget are not spent within the fiscal period, they could be invested in some liquid securities or more probably put back into the common surplus and credited to the factory account.

So much for methods of attack. The point is that regardless of the method, financial executives must recognize the implications of the practical situation and work out a solution most compatible with their general fiscal policy. If the replacement of equipment is made a regular feature of the financial budget, the success of the equipment program is assured. And it can be run on a pay-as-go basis.




*"The Fundamentals of Industrial Equipment Policies," by F. E. Raymond. Mechanical Engineering, July, 1933.

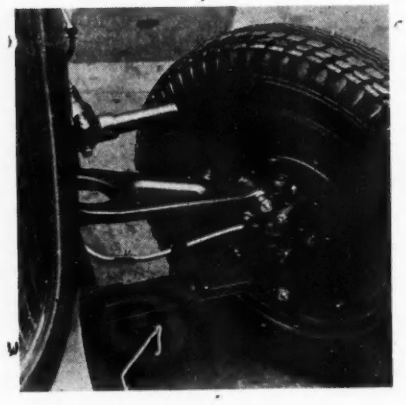
# New Praga Baby Has Novel Box Section, Backbone Type Frame

A RECENTLY developed light car that has aroused considerable interest among European automobile manufacturers is the Praga Baby, which made its debut at the Prague automobile show in April last. It is manufactured by the Automobile Division of Ceskomoravska Kolben Danek, Ltd., a firm which was prominent in the automobile industry of the old Austro-Hungarian Empire previous to and during the world war.

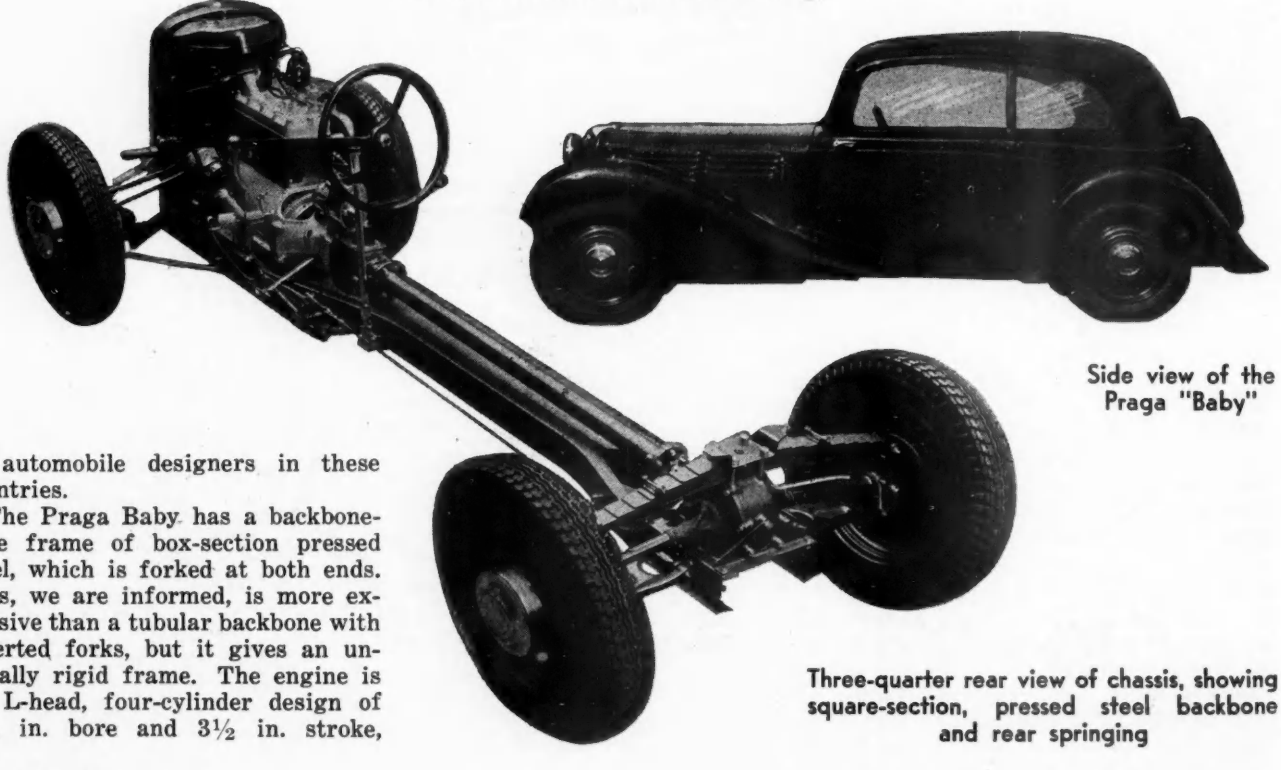
Owing to market conditions, manufacturers in European countries pay particular attention to cars with small piston displacement and low fuel consumption but capable of speeds up to 65 m.p.h. The high annual taxes, the high cost of fuel, and the limited means of purchasers place severe restrictions on the work of automobile designers in these countries.

The Praga Baby has a backbone-type frame of box-section pressed steel, which is forked at both ends. This, we are informed, is more expensive than a tubular backbone with inserted forks, but it gives an unusually rigid frame. The engine is an L-head, four-cylinder design of 2⅜ in. bore and 3½ in. stroke, which makes the piston displacement 60 cu. in. It has a three-point support on rubber. Its maximum output is 22 hp. at 3200 r.p.m. Bohnalite pistons are used, the compression ratio is 5.6, and the combustion chambers are of Ricardo type. Cylinder heads are of aluminum alloy, the cylinder block is an iron casting, and the crankcase a casting of magnesium alloy. Valves are of chromium-silicon steel and have a lift of 9/32 in. Fuel feed to the Zenith carburetor is by gravity from an 8-gal. dash tank. The Bosch 6-volt starting and lighting system is standard equipment, as are Champion spark plugs and a 6-volt 75-amp-hr. battery, with charging light on the instrument panel.

The clutch is a single-plate type and the transmission has three forward speeds and one reverse, second and third gears being synchronized. Fabric-type universal joints are incorporated in the propeller shaft. All four wheels are independently sprung. The reduction ratio of the rear-axle drive is 5.55. Tires are low-pressure balloons, 4.75 by 16 in. All springs are of the semi-elliptic type and have two reverse leaves for



Detail of front independent suspension



Side view of the Praga "Baby"

Three-quarter rear view of chassis, showing square-section, pressed steel backbone and rear springing

Details of rear assembly of Praga car

damping purposes. The two upper leaves embrace the shackle pin. Steering is through a spur pinion and rack. Brakes of the internal type act on pressed-steel drums on all four wheels.

The car has a tread of 44 in. in front and 42 in. in the rear, while the wheelbase is 100 in. Its weight is 1600 lb. A fuel mileage of 31 per gallon, with good acceleration and hill climbing ability, is claimed. The over-all height of the closed model is 58 in. and the road clearance 8 in., and the low build of the car gives it excellent stability on turns.

Of particular interest to American designers are no doubt the frame construction and the system of independent springing; these mechanical features, as well as the body lines, are brought out clearly in the photos reproduced herewith.

# Mack Axles Now Have Involute Splines

AXLE shafts of Mack trucks now come with involute instead of with rectangular-section splines. The static torsional strength remains the same, but torsional shock-load tests are said to have shown the new shaft to have four times the endurance under a given shock. The splines themselves, naturally, are stronger, because the root area is greater than in the case of rectangular splines, and there are no sharp corners. Owing to the fact that the pressure on the contact surfaces of the splines is not tangential to the pitch circle but makes an angle with a tangent to that circle at the point of contact, there is a certain expanding force acting on the hub, but tests are said to have shown that the hub is much stronger than the shaft, so no trouble needs to be feared from this cause. The angular contact, moreover, has a centralizing effect, which tends toward more nearly uniform distribution of load between the different splines. Eleven involute splines are used, as compared with 10 rectangular splines formerly.

The drawing reproduced herewith illustrates the evolution in splining practice at the Mack plant during the last 15 years or so. The drawing on the left shows a shaft with rectangular-section splines produced by milling. In order to prevent a slight fillet from forming at the bottom of the spline groove, it was necessary to undercut the bottom on both sides, and this necessarily reduced the torsional strength of the shaft, which is principally that of the core below the splines. Then a method of forming rectangular splines by hobbing was evolved, and the resultant shaft section is shown at the center. The involute splines, shown on the shaft section on the right, are also formed by hobbing.

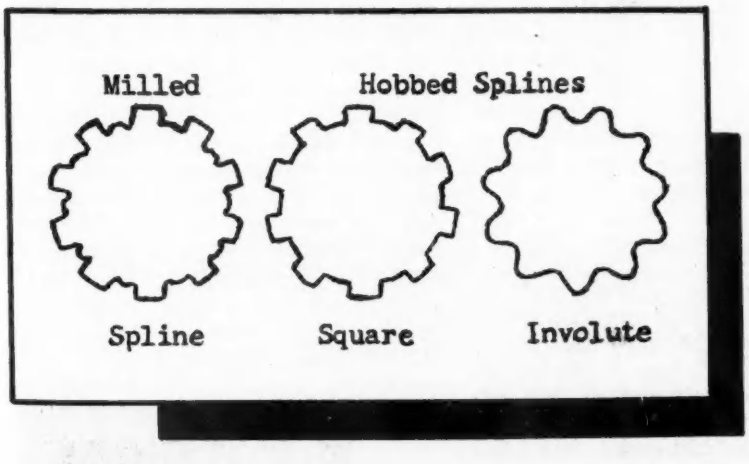
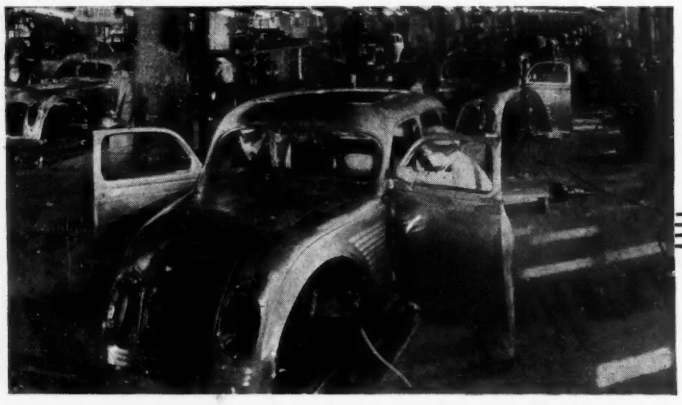



Diagram showing sections of splined axle shafts. The involute-splined type is the one now used

## New Willys Pinion Mounting

THE main drive pinion in the Willys 77 is now straddle mounted, being supported by a taper roller bearing in front and a straight roller bearing in the rear, both bearings being of the caged type. The design permits of the use of a one-piece malleable housing instead of the usual banjo and third-member casting, which results in a more rigid mounting for the differential and reduces the unsprung weight.



Chrysler Airflow bodies getting the finishing touches on the way to the final trim line

# PRODUCTION LINES

## Dilemma

Several well-known bus engineers talked to us the other day about the use of safety glass in buses. Question is, is safety glass safe for bus windows. These engineers say no! They claim that in case of accident—fire or overturning, etc., it is impossible to break through. However they are in favor of safety glass for front and rear windows. We are told that at least one State prohibits the use of safety glass in side windows, while another makes it necessary to carry a carpenter's kit if safety glass is used. Looks to us that this situation should be investigated and clarified by the newly formed A.S.A. committee on safety glass. Otherwise there will be a lot of confusion and uncertainty.

## Noise vs. Traction

Whether based on fact or fancy, some car owners are dissatisfied with the tire equipment which was designed especially for independently suspended wheels. They want more traction—more tread area to give them a feeling of greater safety. As we said, this may be a purely psychological effect but if they want more tread, they will probably get it.

## Under Control

Met one of the outstanding research men at the A.S.T.M. meeting. We talked about the up-and-coming technique of statistical control and found that this man has been using a simple form of control for many years. It consists of building up frequency curves in which the numerical values of the significant variable are plotted against the frequency of occurrence. This produces the well-known probability curve, showing the value of the average, its location, etc. The information thus obtained is of value in checking and controlling the quality of various plants of the company as well as their outside suppliers.

## Stainless Clad

At last a manual on the fabrication of stainless clad steel. The need for a guide has been met by the Ingersoll Steel and Disc Co. The manual is concerned with economical methods of welding, riveting, drawing, and treating of IngAclad. It should be of practical value to designing engineers and factory executives.

## Fatigue Tests

At the recent annual meeting of the A.S.T.M., G. N. Krouse of the University of Illinois, described the use of several special high-speed testing machines for speeding up fatigue tests. One machine has a range of 5000 to 30,000 r.p.m. One of the most valuable features of the high-speed test is the use of small inexpensive test specimens. No appreciable speed effect has been noted up to 10,000 r.p.m. Above this speed, values of endurance limit increase. The technique seems to open the way to speed and economy.

## Plenty Good

R. L. Templin tells us that the endurance limit for duralumin has been checked with repetitive stress tests running over 800,000,000 cycles. That certainly provides a safe figure with which to work. On the basis of 50,000,000 cycles, dural has an endurance limit of 19,000 lb. per sq. in.

## Elevated Train

E. G. Budd has just completed a five-section elevated car for experimental runs in New York. It's an articulated unit similar in structure to the Burlington Zephyr. Extremely light-weight, the car is designed for great acceleration and deceleration, the latter attribute being a function of the braking system. What with the motorized train and now this rapid transit city car, Budd is putting the new idea to work in passenger transportation.

## Melting News

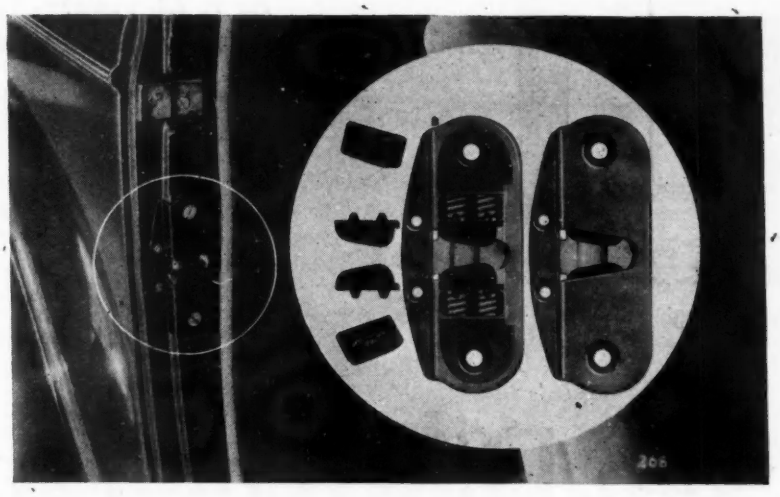
Are you acquainted with "A Digest of Electric Melting News," which is being published monthly in the interest of the electric furnace method of producing castings of assured pedigree? It's of interest not only to the metallurgist but to the designing engineer who desires to keep up to date. If you don't get it regularly, let us know. We'll see that you are on the mailing list—without obligation of course.

## Frozen Salt

Salt Ice, a frozen eutectic salt made by freezing a mixture of water and sodium chloride, is a new refrigerant which is said to provide a low, uniformly cooled atmosphere. The brine is frozen on a FlakIce machine into ribbons and broken into flakes one to three inches square and about ⅛ in. thick. Melts at minus 6 deg. F. Three pounds of Salt Ice is said to do the work of one pound of Dry Ice at very low cost. The frozen salt has been used on a number of refrigerated truck body jobs with good results.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

# Molded Door Bumpers Represent New Automobile Practice



The molded bumper shoes are shown in detail and mounted

One of the most interesting recent automotive applications of plastics is in the manufacture of molded bumper shoes for the door dovetail assemblies of many 1934 cars. This development grew out of the search of automotive body engineers for a door bumper casing assembly that would be free from squeaks and rattles for the life of the car, without requiring oiling or greasing. In the past the entire assembly was made of metal.

It hardly seemed feasible to use molded plastic material in a service where even ferrous metals wear sufficiently to cause squeaks and rattles after a few thousand miles, but it is a peculiarity of synthetic plastics that when in contact with wearing surfaces of metal, as in gear trains, there is a great reduction of wear on both materials. Preliminary tests duplicating the impact and friction of door bumper shoes against the wedge plates made this peculiarity quite evident.

In developing the first molded shoes, the fabricator, Chicago Molded Products Corp., found that graphite could be incorporated into the molding powder to reduce the coefficient of friction and ease the entry of the wedge. Coil springs were imbedded in the non-blooming rubber cushions to lengthen their life, into which bosses on the molded blocks would fit. A special type of extra-strength Durez molding compound was decided upon, after tests with single cavity molds.

First tests took place in the laboratory hot rooms and cold rooms to determine any effect of heat and cold on the assemblies. This being satisfactory, road tests were started with assemblies built into the various makes of cars. At the end of 25,000 to 30,000 miles of winter and summer driving over all types of roads, squeaks and rattles were still absent and the Durez blocks were found to be in excellent conditions.

## New Line of Valve Springs

The Toledo Steel Products Co., Toledo, Ohio, announces a new line of valve springs designed to meet the requirements of high-speed engines. They are finished as specified by car manufacturers, and where necessary are marked with contrasting colors to show which end of the spring should rest on the valve seat.

All wire entering these springs is held to strict analysis and carefully checked for flaws. Springs are accurately coiled on automatic machines and heat-treated to car manufacturers' specifications.

In addition to the valve springs the Toledo Steel Products Company has entered upon the production of valve-stem keys.

## Ignition Coil Protected Against Shock and Water

A new ignition coil, said to be capable of operating even with the secondary terminal and entire case submerged in water, was announced recently by the Mallory Electric Corporation of Detroit. It is designed for automobile, truck and marine use, and its windings are cushioned against shock. The coil is designed to give an adequate output at all speeds without excessive current consumption. A special arc-resisting Durez composition is used for the molded covers at both ends and breakdowns through arcing or the formation of carbonized leakage paths are said to be eliminated. The entire case is also molded of Durez, to exclude moisture and to prevent damage of the windings by excessive engine heat.

Mallory waterproof ignition coil with Durez housing

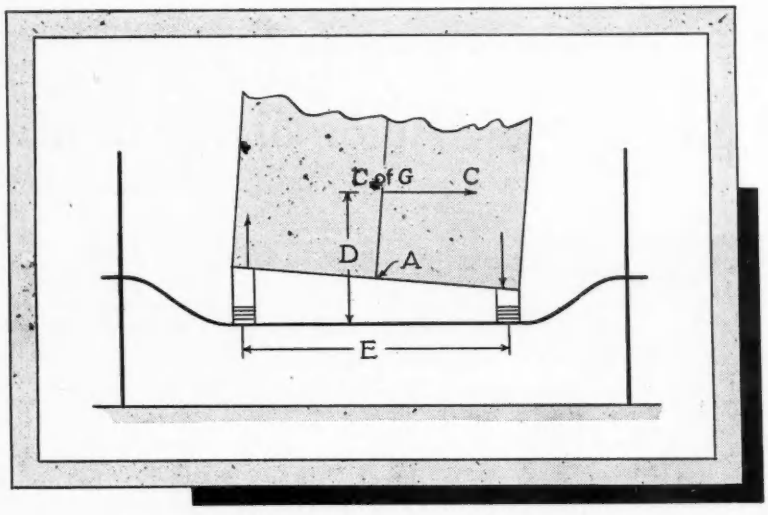



Fig. 1—Side sway with conventional springing

by P. M. Heldt
Engineering Editor, Automotive Industries

# Car Sway with Different Types

WHEN a car describes a curve, the centrifugal force acting at its center of gravity tends to displace it along a line extending radially from the center of the curve. Adherence between the tires and the ground prevents or restricts such motion, but since the center of gravity is usually located above the chassis springs, the centrifugal force on the car body compresses the springs on the outer side more and reduces the compression of the springs on the inside of the curve, thereby causing the car body to sway. The relations are somewhat as illustrated in Fig. 1.

Centrifugal force does not place any additional load on the chassis springs; it merely transfers load from the springs on one side to the springs on the opposite side, hence the mean compression of the springs on opposite sides remains the same and point $A$ remains at the same level. It might be assumed, therefore, that the swaying motion took place around this point and that the distance from $A$ to the center of gravity marked the length of the lever arm through which the centrifugal force acts in causing sway of the car body. As a matter of fact, swaying takes place around an axis somewhat lower than $A$, for the reason that the connections between the axles and the chassis frame allow a certain lateral freedom, and the lever arm of the centrifugal force is somewhat longer, extending approximately to the axle center.

If the centrifugal force on the car acting at the center of gravity of the spring-supported mass is $C$ and the lever arm through which it acts is $D$, then the moment created by it is $CD$, and this must be equal to the moment of weight transfer from the inner to the outer spring. If this weight transfer is $S$ and the spring center distance $E$, then a couple $SE$ is created which must be equal to $CD$. The transfer of load $S$ from the inner to the outer spring causes the latter spring to compress an additional distance $d$, and if the rate of this spring in pounds per inch of compression is $r$, then

$$dr = S.$$

Remembering that $SE = CD$, we may write

$$d\,r\,E = CD,$$

from which it follows that

$$d = CD/rE$$

Now the angle of sway $\theta$ is such that $\tan\theta$ is equal to $d/0.5E$ or to $2\,d/E$. Substituting we get,

$$\tan\theta = 2\,CD/rE^2$$

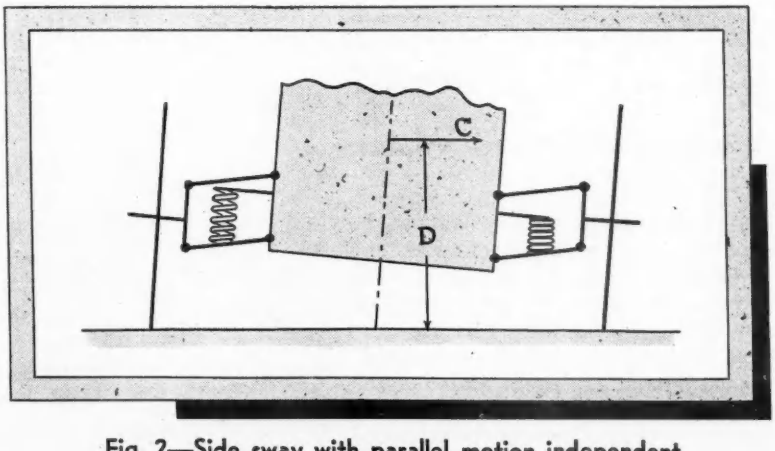



Fig. 2—Side sway with parallel motion independent springing

This equation brings out clearly that in order to limit swaying with the conventional construction, in which the wheels remain perpendicular to the road and the body sways by compressing the springs on the outer side more than those on the inner side, it is very important that the spring center distance be made as large as possible, because the sway angle varies inversely as the square of this distance (the tangents of small angles being substantially proportional to the angles).

With the two systems of independent front-end springing now in regular use on American passenger cars the relation between the sway

# of Front-End Suspension

angle and the characteristics of the suspension is somewhat different, however. The diagram, Fig. 2, of course, does not represent these systems exactly, but is representative of the generic "parallel-motion" type in which the wheels are constrained to remain parallel to the body under all conditions. Since the wheels remain parallel to the body, it follows that the body inclines at the same angle as the wheels and that the axis of the swaying motion therefore is at ground level. This gives the centrifugal force a longer lever arm $D_1$ to act through, but the arm of the resisting couple, which is now equal to the wheel tread, is also greater.

With independent springing the rate of the springs is always referred to the center plane of the wheel. This rate, therefore, is equal to the number of pounds which must be applied vertically to the wheel at the middle of its width in order to lift it 1 in., without changing the chassis height. It can be proven with the aid of Fig. 3 that in a conventional car with semi-elliptic springs under the frame side rails, the force which must be applied to one wheel to raise it 1 in. vertically without raising the chassis is equal to the force required to compress one of the springs 1 in. The average compression of the two springs is ½ in., their combined deflection is 1 in., the same as the upward movement of the wheel, and since in springs of this type the force required for compression is proportional to the compression, it follows that the force required to lift the wheel 1 in. while the chassis is held immobile is equal to the force required to compress one of the springs 1 in.

Now let $S_1$ be the weight transferred from one wheel to the other through the effect of the centrifugal force, $r_1$, the rate of the front springs referred to the wheel center, and $d_1$, the additional deflection of the front spring due to centrifugal force, referred to the wheel center. Then

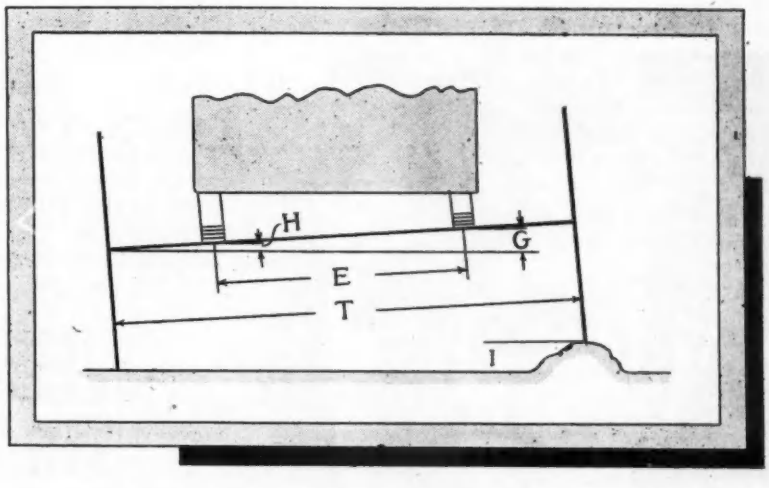



Fig. 3—Relation between spring rate and wheel lift

$$r_1 d_1 = S_1$$

The expressions for the tangents of sway angles are very similar for the two types of construction, but three of the factors in these expressions have widely different values. The centrifugal force $C$, of course, will be the same whatever the type of springing, under similar conditions of weight, speed and turning radius. For the same shock-cushioning effect the spring-rate $r$ for the conventional semi-elliptic springs under the frame side rails should be the same, as the spring-rate $r_1$ of the independent suspension system referred to the center plane of the wheel, but actually the spring-rate is from 2.5 to 3 times as great in the conventional car as in the independently-sprung one. Taking the average of these two figures, 2.75, and assuming that $D_1$ is 1.5 times $D$ and $E$ is $0.5 \times 0.5\ T$, the ratio of the tangents of sway angles in the independently-sprung and the conventional cars would be

$$1.5 \times 2.75 \times 0.5 \times 0.5 = 1.03.$$

This would indicate that the actual sway is only very slightly greater in the independently-sprung car, even when its springs are 2.75 times as flexible. The greatest uncertainty in this comparison, of course, is the ratio of effective lever arms, $D_1/D$, which may well be greater than 1.5. Besides, in the independently-sprung car the sway (or the impression of sway) may well be increased by a factor not taken into account in these equations. This is the fact that when the wheels tilt slightly toward one side the car rolls on its tire section, thereby producing an additional lateral motion of the whole car which the passenger takes to be side sway. Calculation shows that for a wheel of 28-in. diameter with 6-in. tire, this

additional side motion for a sway angle of 5 deg. amounts to about ¼ in., while a sway of 5 deg. with a seat height of 30 in. moves the seat 1⅛ in. laterally.

From the fact that in a vehicle with independent suspension of the type in which the wheels always remain parallel with the body, they tilt on curves, it might be assumed that such vehicles were less stable and had a greater tendency to overturn on curves. Such is not the case, however, for in any vehicle the overturning moment due to centrifugal force is due to the product of the centrifugal force by the distance from the center of gravity of the car to the ground, and as long as the centrifugal force, the height of the center of gravity, and the width of tread are the same, the factor of safety with respect to overturning is the same, no matter what the suspension system.

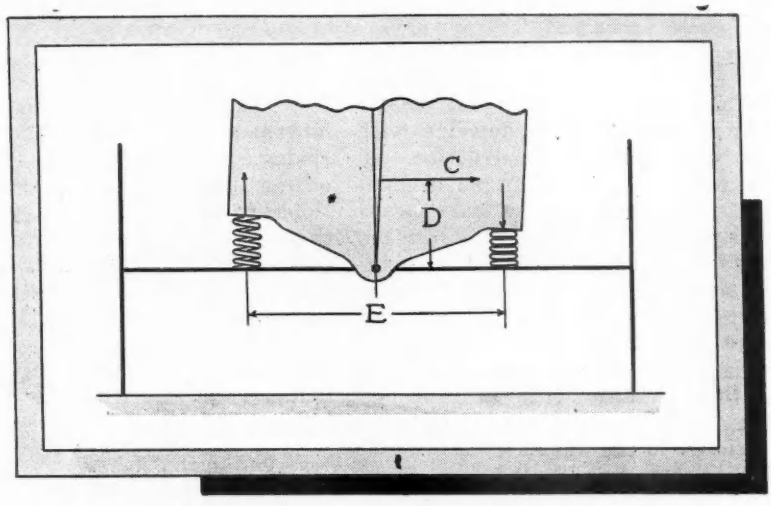



**Fig. 4—Side sway with swinging axles**

**With this form of independent springing the wheels remain perpendicular to the road**

# Automotive Oddities—By Pete Keenan

337 370
OLE LEE'S LICENSE NUMBER SPELLS HIS NAME WHEN TURNED UPSIDE DOWN.
A ROAD-SIDE SIGN NEAR BOSTON.
FRESH EGGS
HONK AND DRIVE IN
MICHAEL SZIVERY WAS CHASED THREE MILES MINUS A REAR WHEEL. Camden N.J.
THE MULEOBILE A PRODUCT OF THE DEPRESSION. MADE FROM OLD AUTO PARTS AND USED BY WACO BRADY AND GENEVA TURNER WHEN THEY ELOPED. Walhalla. S.C.
LEOPOLD STOKOWSKI
FAMOUS CONDUCTOR HAS A TRICK 3-WHEELED CAR. STEERED MARINE FASHION BY SINGLE REAR WHEEL. IT IS SOUND-PROOF AND HEAT-PROOF. HAS A PERISCOPE FOR A REAR VIEW MIRROR CAN DO 120 M.P.H. AND GETS 40 MILES TO A GALLON.

# Valve Seat Insert Practice at the White and Domark Plants

TO further round out the picture of valve insert practice as published in *Automotive Industries*, May 26, 1934, we are giving the details of the White and Domark insert construction just made available.

The well-known screwed-in type of insert developed by the White Motor Co. in its present improved form is shown in Fig. 1. It consists of a steel ring threaded on the outside and screwed into corresponding threads in the exhaust port openings. The ring is faced with Stellite which is puddled on to the ring by oxy-acetylene welding on a special fixture.

Perhaps the most important feature of the construction is the fact that the insert is installed in a normal fashion without resorting to an interference fit demanding a heating or freezing operation. Limits on the seat and block dimensions are said to be so closely controlled as to make it unnecessary to use selective fits at assembly. Part of the control comes in a constant check of the equipment used in producing the seat and block operations.

At assembly the seat is screwed down on a soft metal washer. Part

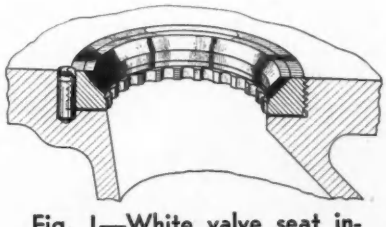


Fig. 1—White valve seat insert construction features a screwed-in ring locked permanently by a single dowel, driven in and peened over

of the locking effect as well as better thermal contact between the non-pressure side of the threads and the block is achieved through the use of a special rusting compound which has been used from the time the construction was first brought out.

The seat is locked permanently in place by a single dowel driven into the drilled hole. After being driven below the surface, the dowel is held in by peening the block material into the opening and down around the beveled head of the dowel. It is claimed that a great many of these seats have seen hundreds of thousands of miles of service without complaint and seem to be practically indestructible.

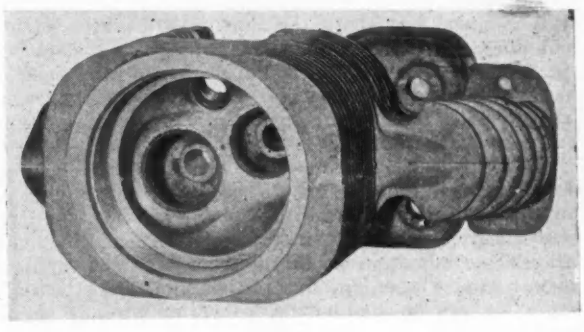


Fig. 2—Domark cylinder head showing Ni-Resist insert rings, intake and exhaust, fitted by expanding the port opening, and locked by peening

Domark inserts used by the Doman-Marks Engine Co. are turned rings of Ni-Resist shrunk into both intake and exhaust ports of the aluminum alloy cylinder head shown in Fig. 2. At assembly the machined casting is heated to about 600 deg. F. and held at that temperature for approximately two hours. The head is then removed from the oven, the valve guides dropped into place, and at the same time the aluminum bronze spark-plug bushing installed. The head is then turned over and the Ni-Resist valve seat inserts dropped into position. These inserts are not cooled by any artificial means but remain at room temperature. When the head is heated the insert hole is increased to such a size that the insert is very loose. Of course as soon as the heat runs into the insert it expands at approximately the same rate as aluminum and is made tight.

After the entire assembly has cooled down it is placed under a machine where the head material is rolled into the groove on the insert, thus preventing any possibility of the insert becoming loose. The peening operation is made with a tool similar to the one shown in Fig. 5 in the original article. The interference fit is 0.003-0.005 in. on all models, except on the inlet valve of two sizes where the fit is 0.002-0.004 in.

The analysis of the Ni-Resist alloy iron used in making the Domark insert is as follows:

| | | |
|---|---|---|
| Total carbon ... | 2.80- 3.10% | |
| Silicon ..... | 1.25- 1.50% | |
| Nickel ..... | 13.50-14.50% | |
| Copper ..... | 5.50- 6.50% | |
| Chromium ..... | 2.00- 2.25% | |
| Manganese .... | 1.00- 1.50% | |
| Sulphur ..... | .10% | Max. |
| Phosphorous ... | .30% | Max. |

—J. G.

## Saunders Gives Pointers on Engine Cooling

SOME pointers on engine cooling systems which should prove of interest to designers, were given by L. P. Saunders, Director of Engineering of the Harrison Radiator Co., in a paper contributed to the recent Purdue Service Conference.

Mr. Saunders said the rate of cooling-water circulation should be sufficiently high so that the temperature rise will not exceed 10 deg. with the engine running under full load at maximum speed. With a water inlet temperature of 190 deg. F., the pump suction should not exceed 7 in. of mercury column.

Resistance to flow through the cooling system should be low, to reduce the load on the pump. Pump delivery should not decrease rapidly with an

increase in resistance to flow. Water temperatures should be substantially uniform throughout the cylinder jacket, cylinder-head jacket, and around the exhaust ports. A difference of 10 deg. is permissible. With the water temperature at the inlet to the jacket equal to 190 deg. there should be no local boiling in the jacket. This can be checked by inserting a glass tube between the engine and the radiator.

No water space should be less than ⅜ in. wide, while above the exhaust ports there should be at least 1½ in. water space, and above the combustion chamber at least 1 in. The water-jacketed length of the exhaust port must be as short as possible. Exhaust-valve seats must be completely surrounded with water.

As long as the engine runs without knocking, an increase of 30 per cent in the explosion pressure does not add materially to the temperature of the gases of combustion at the moment of exhaust-valve opening, but the change from smooth to detonating operation may raise the gas temperature at this moment by as much as 250 deg. F.

Since water expands about 6 per cent for the maximum rise in temperature occurring in a cooling system, and Prestone about 12 per cent, the top tank should have a capacity equal to at least 15 per cent that of the entire system.

Looking into the future, Mr. Saunders predicts that passenger car design will be along the lines of either the LaSalle or the Airflow Chrysler. He showed a curve which indicated that with the LaSalle design (where the radiator core is quite narrow) adequate cooling capacity may be obtained. The present design of the Airflow car permits of the use of a full-size radiator core.

Some type of variable fan drive is very desirable to combine adequate air flow at low speeds with moderate fan speed at high car speeds in order to reduce or eliminate fan noise. On some of the larger cars it may be found desirable to go to chemical cooling (the author evidently had in mind the use of a high-boiling point liquid) and mounting of the radiator directly on the engine, so that there can be no relative movement between the two. Since it has been found practical to use gasoline pumps and delicate needle valves in the fuel system, leaks in which could not be tolerated, there seems to be no good reason why the cooling system of a car could not be filled with a cooling compound at the factory and give satisfactory service without attention to this feature over long periods.

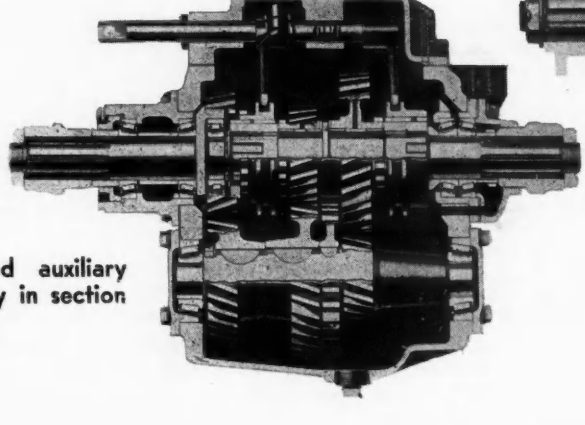
# Spicer Auxiliary Transmission

SPICER MFG. CORP., Toledo, Ohio, has developed a series of two-speed and three-speed auxiliary transmissions for commercial vehicles, intended to increase the pulling power and widen the speed range of such vehicles. These transmissions are being offered for both factory installation and installation in vehicles already in service.

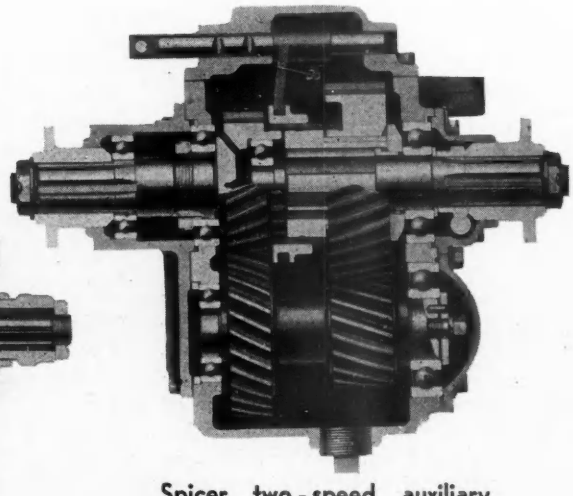
A two-speed (underdrive or overdrive) and a three-speed (overdrive and underdrive) auxiliary transmission used back of the main four- or five-speed transmission greatly increases the ability of the truck. Where a smaller reduction ratio only is desired for the sake of more economical operation, a two-speed auxiliary transmission with an overdrive speed is available.

The three-speed auxiliary transmission is recommended for use where trucks have to negotiate bad roads and steep hills, since the unit gives additional torque range. High speed is made available while running light on smooth roads; low-low speed for hard pulling, and seven intermediate speeds for meeting intermediate conditions. Since this auxiliary gives a maximum reduction between crankshaft and drive wheel which is at least twice as great as that with the main transmission alone, the tractive force available for hill climbing is increased, and the engine also can be used as a more effective brake during descents. The low-low speed likewise enables the chassis frame to weave slowly, which is said to reduce the stress on chassis parts and thus reduce the item of upkeep.

Where trucks are operated at maximum speed with the auxiliary transmission in overdrive and the main transmission in direct, the road speed is increased approximately 25 per cent, with no appreciable increase in fuel consumption, it is claimed.



Spicer three-speed auxiliary transmission, partly in section



Spicer two-speed auxiliary transmission, partly in section

## Mercury Heavy Duty Low Lift Truck

Mercury EL Model A-1010, a heavy duty, 5 ton low lift trucks was recently announced by Mercury Manufacturing Company, Chicago, Ill. It presents a number of exclusive Mercury features, including the hydraulic lifting system, magnetic contactor control, double reduction bevel and spur gear drive axle, semi-elliptic spring suspension, brakes in the wheels, and a positive and automatic overload protection. A four-wheel trailing axle is employed, ball bearing mounted, and all six wheels of this truck are steering wheels.

The hydraulic lift system also provides an automatic and positive overload protection, by means of a simple relief valve which may be set for the maximum allowable load. In actual use it is impossible to overload the truck, as the action of the relief valve prevents picking up more than a capacity load.

# NEW DEVELOPMENTS
## Automotive Parts, Accessories and Production Tools

### Hydraulic Crank Pin Grinders

The new Landis 16 in. Type D Hydraulic Crank Pin Grinder just announced by the Landis Tool Company, Waynesboro, Pa., is a highly refined machine for the rapid production grinding of crank pins. Like the first Landis hydraulic crank pin grinder announced nine years ago, the major advantage of the new Type D is the combination of design features which make possible grinding all the pins of any crankshaft on one machine with but one handling of the work. This is brought about by attaching the work rest to the front of the bed and properly coordinating the work rest jaw movement with the wheel feed, the table traverse and the means provided for clamping, radial locating and longitudinal spacing.

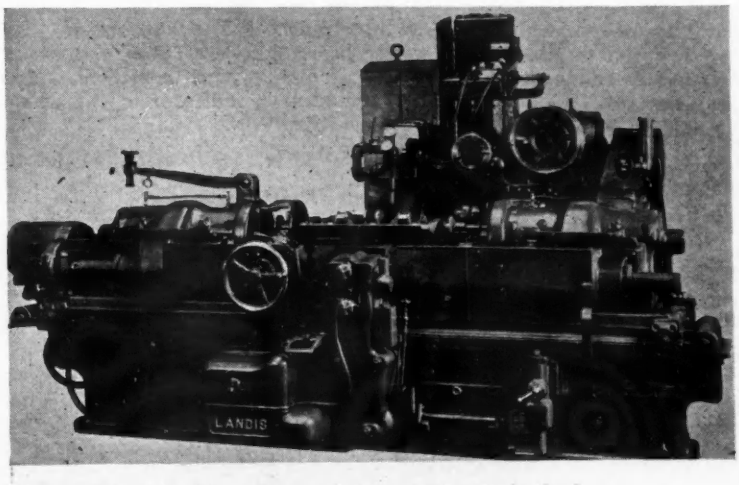
Crank head spindles and bearings are larger than they have been heretofore. The wheel drive motor is mounted on the rear of the massive wheel head. From this point it drives the wheel spindle on the end by means of multiple V belts. The wheel spindle is large and the long bearing surfaces of the babbitt lined steel wheel spindle bearings give it solid support.

Controls are arranged in such a manner that the main control lever has a large number of functions. As it is shifted from one position to another it (1) clamps the work, (2) starts work rotation, (3) advances the work rest shoes, (4) withdraws the work rest shoes, (5) disengages the spacing bar plunger, (6) traverses the work table either right or left, and (7) releases the spacing bar plunger. Another convenient lever to the left of the main control lever is used to unclamp the work.

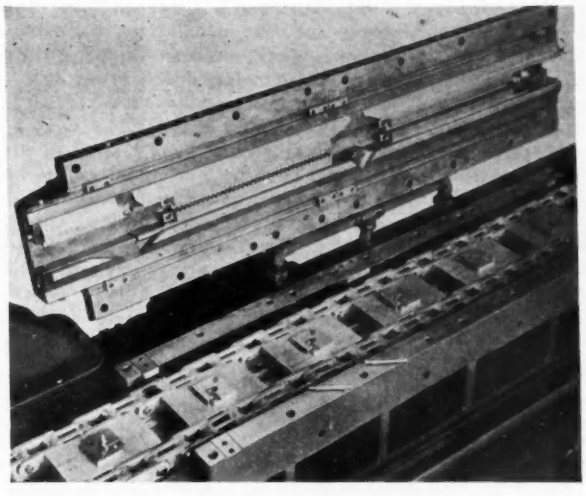
Because the grinding of crank pins is at best a complicated operation, numerous safety features have been provided to protect the machine and operator from injury in the event there is a slip-up at any point. A mechanical inter-lock in the main control mechanism makes it impossible when grinding to traverse the table or when traversing with the wheel in (that is, during truing) it is impossible to rotate the heads. The heads will not rotate with the work unclamped nor will the heads rotate during work table traversal. As long as the work rest shoes are in their operative position the work table cannot be traversed. If for any reason pressure in the hydraulic system drops, work rotation will automatically stop.

Hydraulic power is employed to traverse the work table, feed the grinding wheel, operate the work clamps and spacing bar plunger and move the work rest shoes. A 36 in. diameter grinding wheel is considered standard although 42 in. wheel equipment is available. Another interesting piece of optional equipment is a wheel dresser built into the top of the grinding wheel fender. The dressing wheel is hydraulically driven. Its use facilitates dressing the wheel inasmuch as the dressing wheel is always set up and the work need not be removed during the dressing operation.

This new crank grinder is being offered in two sizes, namely, 16 in. x 32 in. and 16 in. x 42 in. The former




The new Landis Type D crankpin grinder is built for rapid production



Foot-Burt has developed an indexing method for continuous surface broacher

### Indexing Added to Broaching Machine

Since announcing the new line of Foot-Burt continuous surface broaching machines in *Automotive Industries*, Jan. 27, 1934, The Foot-Burt Co., Cleveland, Ohio, has developed an indexing method which greatly expands the application of surface broaching.

An example of the process is the broaching of square ends on each end of a spring shackle pin as illustrated. The work passes through the first section of the upper and lower broaches, completing two flats on each end. After this cut, the groove on the top plate of the fixture engages the indexing pin giving the work-holding spindle one quarter turn. The work then passes through the remaining section of the broaches, completing the squares. Work is automatically ejected.

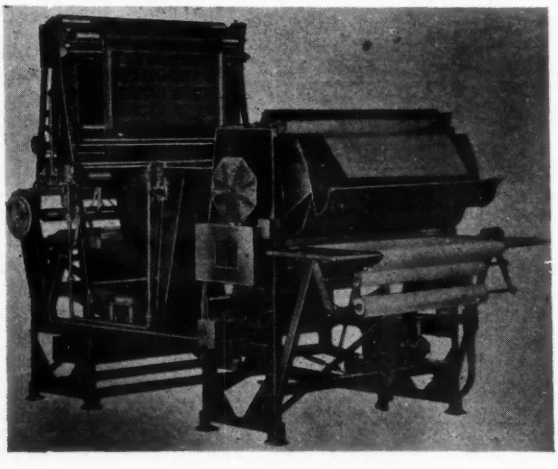
Special indexing cycles can be readily worked out so to handle work of any character, as for example, castellated nuts, gears, etc. In some cases, obviously, the work may have to make several passes through the machine.

# NEW DEVELOPMENTS
## Automotive Parts, Accessories and Production Tools

weighs, net, without electric motors, 16,950 lb., and requires a floor space of 7 ft. 6 in. x 12 ft. The latter weighs, net, without electric motors, 17,250 lb., and requires a floor space of 7 ft. 6 in. x 13 ft. Three 1150 r.p.m. constant speed electric motors are used. The work drive motor is 2 hp., the wheel drive motor 25 hp., and the pump drive motor 3 hp.

### Continuous Production On Blueprints

A continuous blue printing, washing and drying machine, the Model 11, designed to sell at a low price, has been announced by the C. F. Pease Company, Chicago. It produces blue prints at the rate of 12 ft. per min. at low cost.



The new Pease blueprint machine takes paper up to 54 in. wide

The machine is composed of three units—a blue printing machine, a washing unit, and a potashing and drying unit. The blue printing machine can be operated independently of the washing, potashing and drying equipment by means of a simple clutch adjustment. Also, the blue printing machine may be purchased separately and the washing, potashing and drying equipment added later if desired.

Model 11 blue printing equipment is made for paper up to 42 in. in width, though it can be built to order for paper up to 54 in. width. It can be wired to operate on either direct or alternating current of 220 volts, and is powered with a ¼-hp. variable-speed drive motor with a combination gear and chain drive, completely enclosed. The machine is equipped with three new-type Pease "superactinic" high-power enclosed arc lamps, drawing 17 amperes each. These lamps afford a range of printing speed from 4 in. to 12 ft. per min., on either direct or 60-cycle alternating current.

The drying unit is new both in principle and design; it distributes the heat more evenly and consequently assures more nearly uniform drying of the paper. It has a new dryer consisting of three heating units, each of which can be individually controlled. A series of rolls produce an ironing effect as the paper travels up in front of, over, and down in back of the dryer.

The contact glass is larger than on other Pease continuous machines. It is of semi-cylindrical form and so positioned with relation to the lamps as to assure maximum printing efficiency.

A chemical roll applicator, which applies developing solution to the paper, revolves in the same direction in which the paper is traveling, and the developing solution is said to be applied uniformly over the entire surface of the prints.

### Stewart Mfg. Co. Develops Remote Radio Control

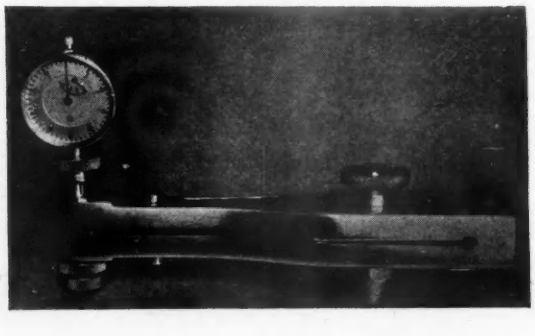
F. W. Stewart Mfg. Co., Chicago, Ill., has developed a remote-control unit for automobile radios. The unit, which is clamped to the steering post, comprises a dial plate with pointer, and two control knobs below it. Connection from the unit to the receiver is made by flexible shaft with suitable housing and end pieces. A light for the dial plate with plain or shielded wire is also included in the outfit.

### Portable Brinell Testing Instrument

A new form of portable testing instrument for making readings of Brinell hardness numbers is being placed on the market in this country by The R. Y. Ferner Co., Investment Building, Washington, D. C. By the use of three sizes of steel balls furnished with the outfit and different pressures it is possible with this equipment to measure the hardness not only of steels, cast iron and hard bronze but also the softer metals, even lead and copper.

This Brinell press is designated as Type M 60/750, the figures representing the range of pressures in kilograms that can be used with the instrument. It consists of a tapered piece of steel seven inches long and weighing about 34 ozs. which is slit, by sawing, from the smaller end to within three quarters of an inch of the larger end. In one surface of the larger end is inserted a holder with steel ball of which three sizes are furnished, of 10mm, 5 mm and 2.5 mm diameter. In the opposite side may be inserted any of three threaded holders.

In the lower of the two prongs, at the small end, is mounted an adjustable screw which can be locked in position. In the upper prong is mounted a small dial indicator which is held in place by a locking nut. This dial is graduated to hundredths of a millimeter, can easily be read to 0.001 mm and has a range of over 3 mm movement. The dial includes an indicator of the whole millimeters.



Portable testing machine for testing Brinell hardness